DINOSAURS!

DISCOVER THE GIANTS OF THE PREHISTORIC WORLD

13

DINOSAURS!

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DINOSAURS!

• DISCOVER THE GIANTS OF THE PREHISTORIC WORLD •

IDENTIKIT

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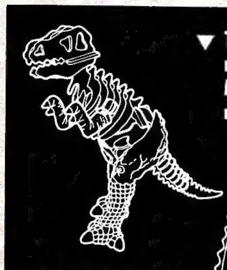
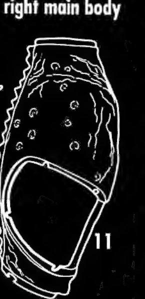
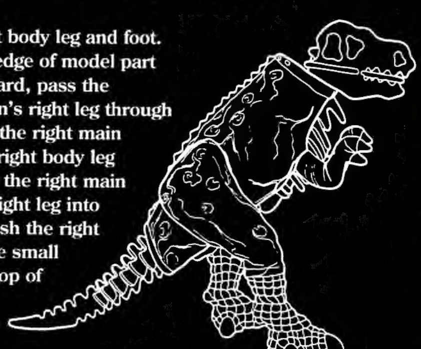


▲ Assembled model from Part 12



▼ This issue's model part
Model part 11 – right main body

Remove the right body leg and foot. With the jagged edge of model part 11 pointing upward, pass the dinosaur skeleton's right leg through the large hole in the right main body. Insert the right body leg into the holes on the right main body. Push the right leg into the right foot. Push the right body arm into the small hole toward the top of the right main body.



◀ This issue's assembled model

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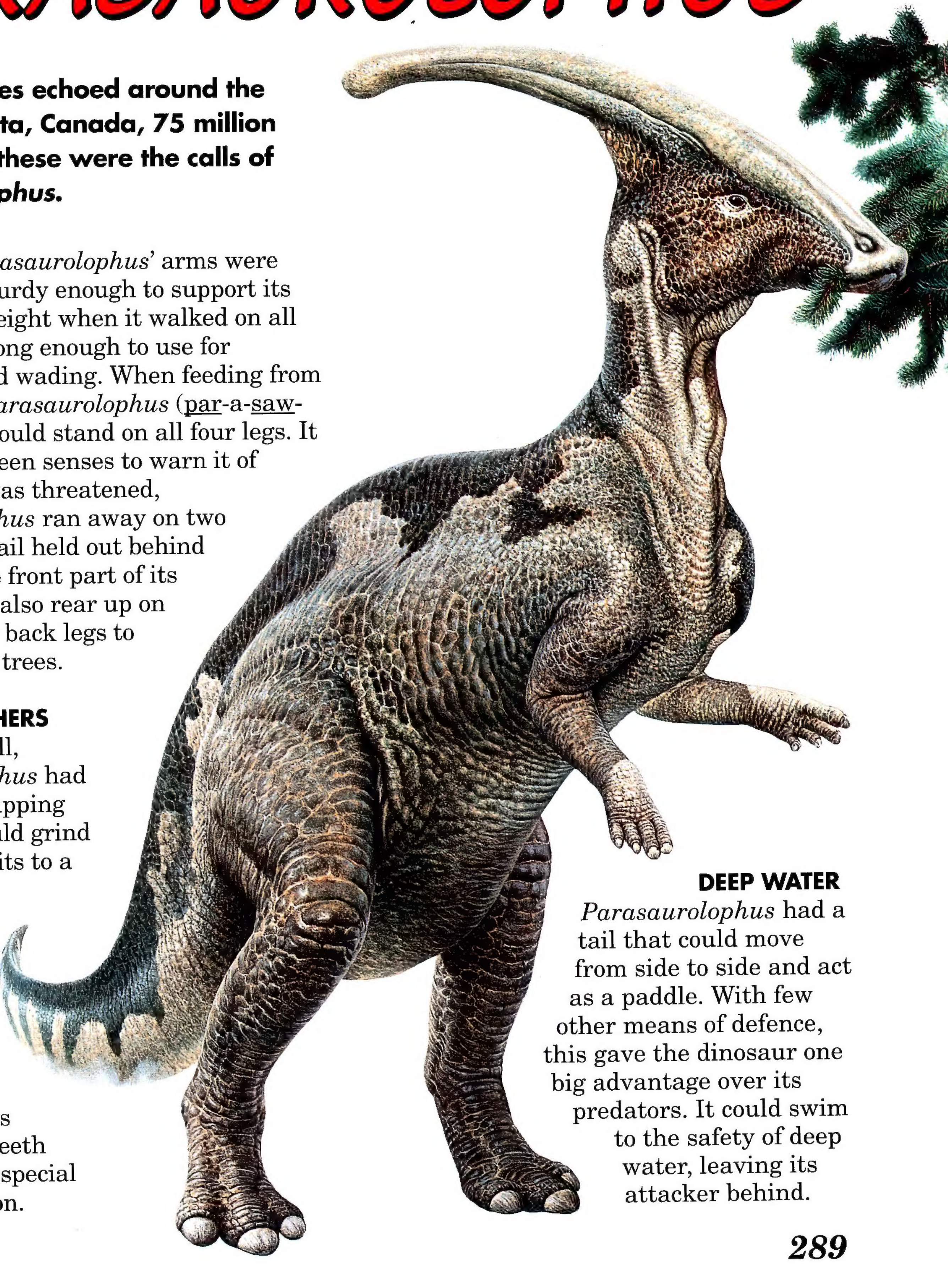
PARASAUROLOPHUS

Strange noises echoed around the hills of Alberta, Canada, 75 million years ago – these were the calls of *Parasaurolophus*.

Parasaurolophus' arms were sturdy enough to support its weight when it walked on all fours, and strong enough to use for swimming and wading. When feeding from the ground, *Parasaurolophus* (par-a-saw-roh-loaf-us) would stand on all four legs. It relied on its keen senses to warn it of danger. If it was threatened, *Parasaurolophus* ran away on two legs with its tail held out behind to balance the front part of its body. It could also rear up on its two strong back legs to feed from tall trees.



PLANT CRUSHERS

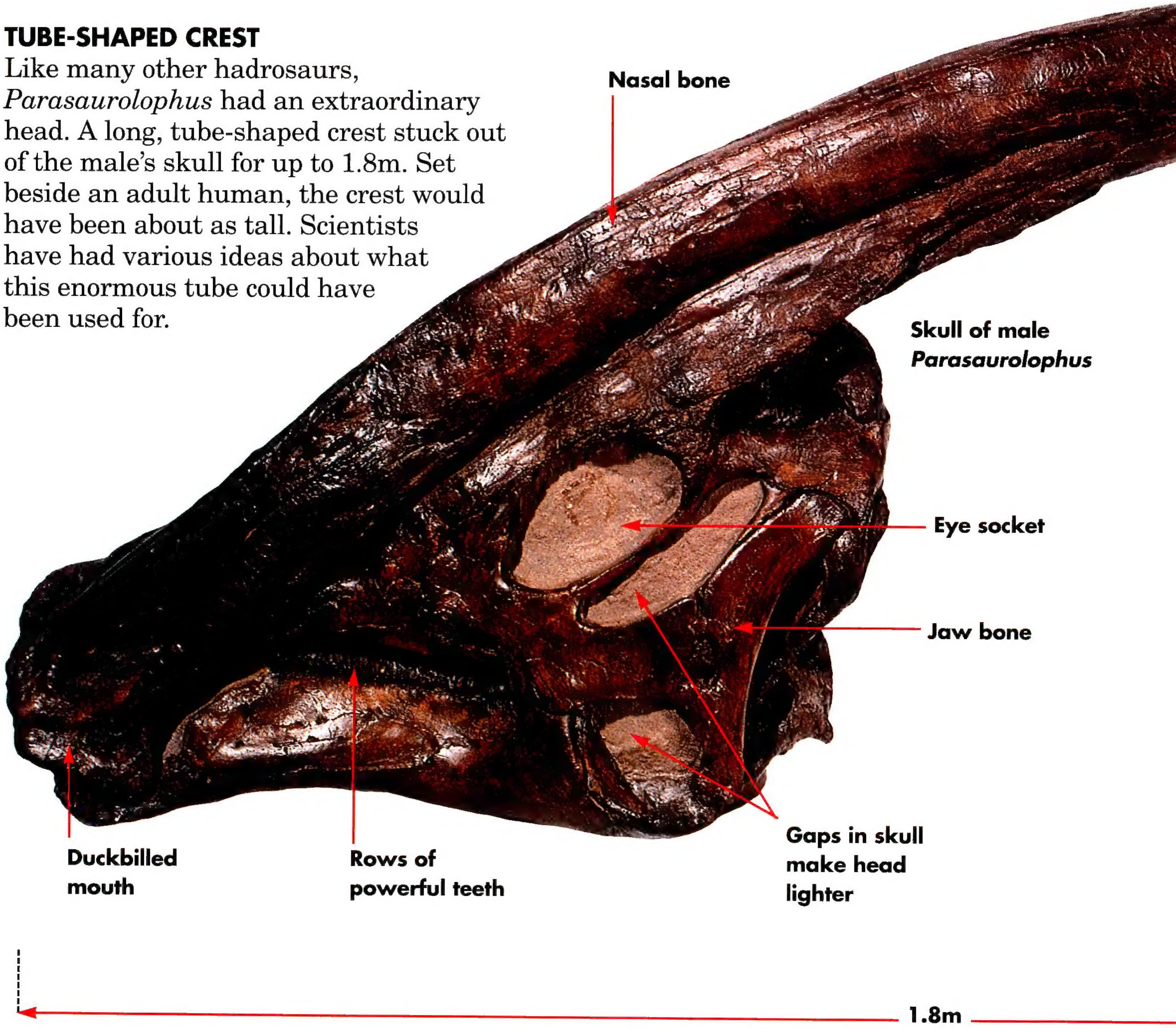
Inside its skull, *Parasaurolophus* had rows of overlapping teeth that could grind twigs and fruits to a pulp. As the lower teeth closed against the upper teeth, the dinosaur's cheek muscles crushed the teeth together in a special chewing action.

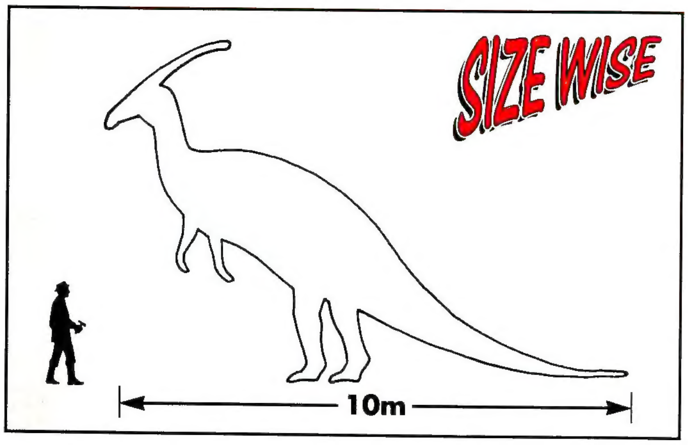
DEEP WATER

Parasaurolophus had a tail that could move from side to side and act as a paddle. With few other means of defence, this gave the dinosaur one big advantage over its predators. It could swim to the safety of deep water, leaving its attacker behind.

TUBE-SHAPED CREST

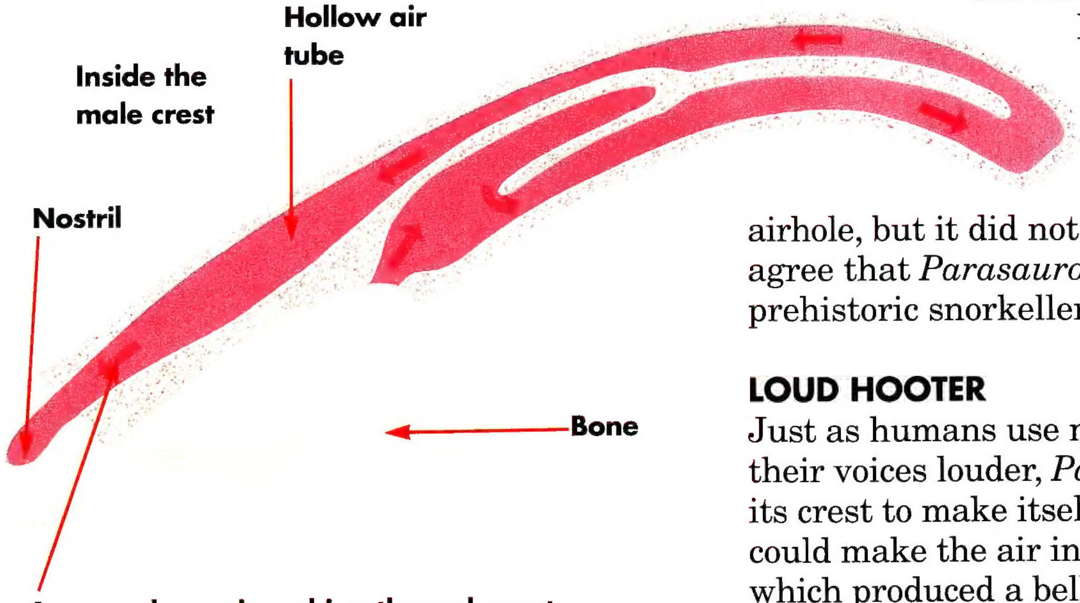
Like many other hadrosaurs, *Parasaurolophus* had an extraordinary head. A long, tube-shaped crest stuck out of the male's skull for up to 1.8m. Set beside an adult human, the crest would have been about as tall. Scientists have had various ideas about what this enormous tube could have been used for.





MONSTER FACTS

- **NAME:** *Parasaurolophus* (par-a-saw-roh-loaf-us) means 'reptile with parallel-sided crest'
- **SIZE:** 10m long
- **FOOD:** plants, fruit and leaves from trees
- **LIVED:** 80 – 66 million years ago in the Late Cretaceous in Alberta, Canada, and the USA



Arrows show air rushing through crest as *Parasaurolophus* breathed out

Here's how *Parasaurolophus* made a racket. As it breathed out, air rushed through its crest. This made the air vibrate, which produced a bellowing sound. Musical wind instruments work in the same way.

SUPER SNORKEL?

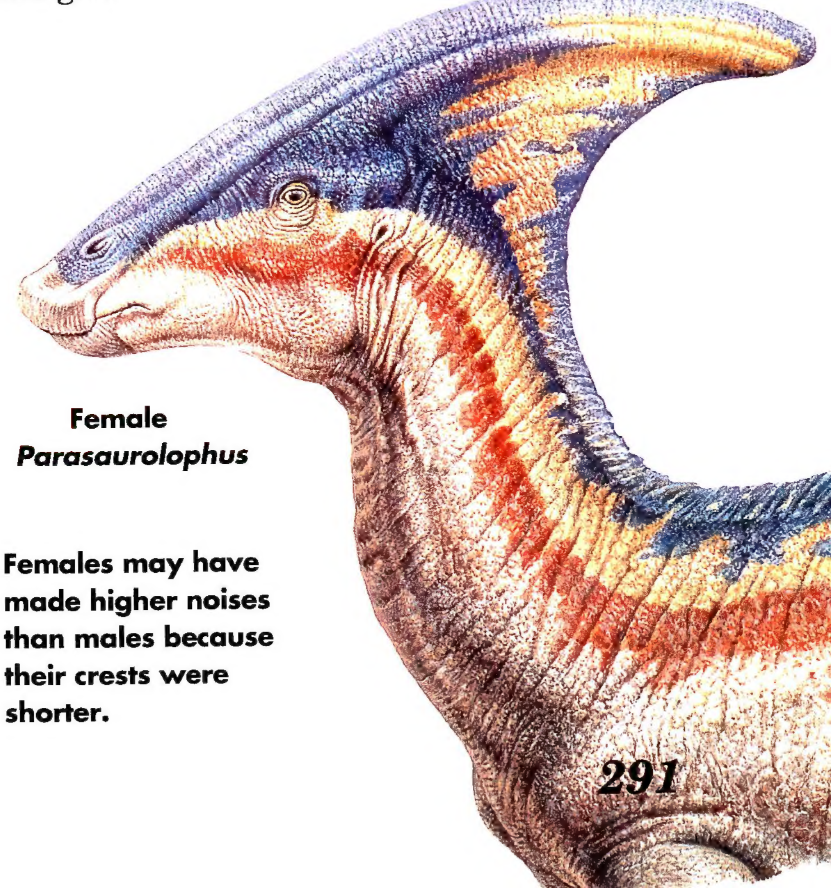
It was once thought that the crest helped *Parasaurolophus* to breathe under water, while it was feeding on waterplants, by acting as a sort of snorkel. The tip of the tube would stick up out of the water while the rest of the dinosaur's head was submerged. For this to be possible, the tip of the tube would have had an airhole, but it did not. So experts have to agree that *Parasaurolophus* was not a prehistoric snorkeller.

LOUD HOOTER

Just as humans use megaphones to make their voices louder, *Parasaurolophus* used its crest to make itself heard. The dinosaur could make the air in the tube vibrate, which produced a bellowing sound. The sound was recognized by other dinosaurs quite a distance away. These noises not only helped *Parasaurolophus* to find each other, but also warned of danger.

STRONG SIGNALS

Some scientists think that the crest was used for knocking leaves out of the way or as a sort of air tank. But the huge crest was probably to help these dinosaurs recognise each other. The crest may have signalled the sex or age of another *Parasaurolophus*. Fossils of their skulls show that fully grown males had larger crests than females and younger members of the herd.



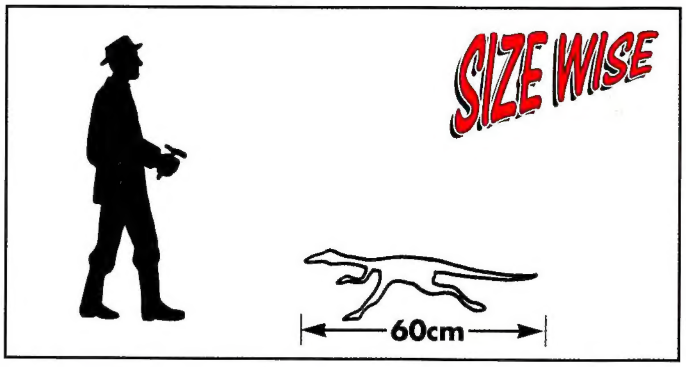
Female *Parasaurolophus*

Females may have made higher noises than males because their crests were shorter.

COMPSOGNATHUS

Compsognathus, one of the smallest dinosaurs, was the size of a chicken.

Compsognathus was a good hunter with keen eyesight. It ran fast on strong, slender back legs and could accelerate quickly to catch the speediest of small animals.



DAINTY DINOSAUR

Compsognathus was more delicate than most dinosaurs. At the end of its long, flexible neck, it had a lightly built skull with lots of space between the bones. Even its 68 sharp teeth were small and dainty, although their sharp, curved edges could do a lot of damage to a smaller creature.

LIGHT FINGERED

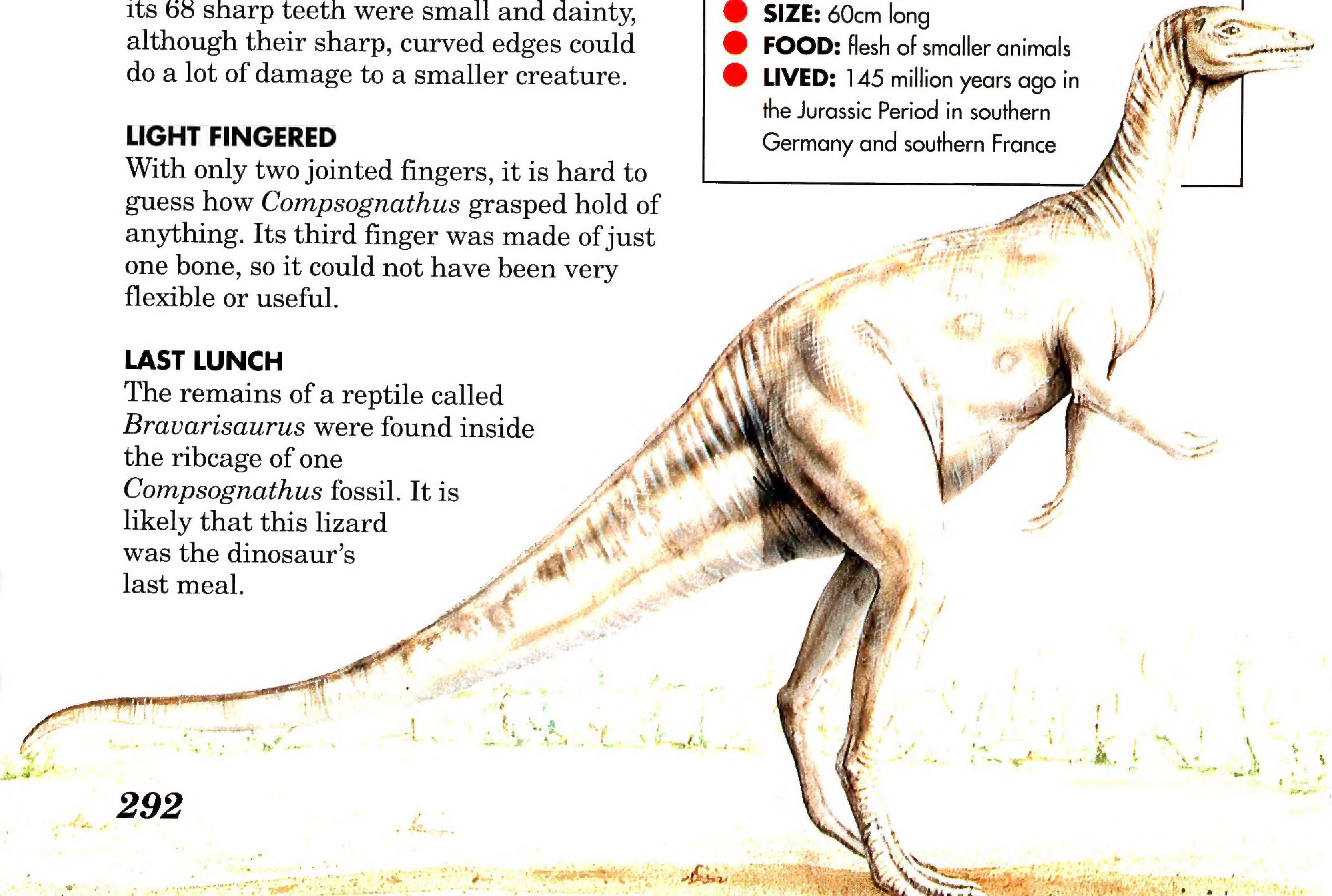
With only two jointed fingers, it is hard to guess how *Compsognathus* grasped hold of anything. Its third finger was made of just one bone, so it could not have been very flexible or useful.

LAST LUNCH

The remains of a reptile called *Bravarisaurus* were found inside the ribcage of one *Compsognathus* fossil. It is likely that this lizard was the dinosaur's last meal.

MONSTER FACTS

- **NAME:** *Compsognathus* (komp-sog-nay-thus) means 'pretty jaw'
- **SIZE:** 60cm long
- **FOOD:** flesh of smaller animals
- **LIVED:** 145 million years ago in the Jurassic Period in southern Germany and southern France



EDMONTONIA

Built like an armoured tank, *Edmontonia* was as long as an elephant and could have looked an adult human straight in the eye.

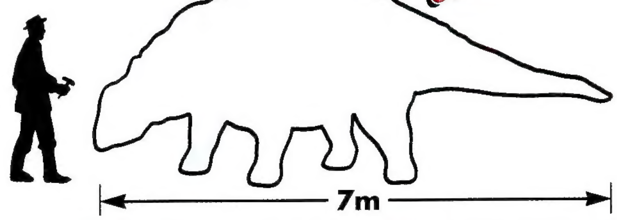
Edmontonia was heavily protected by a shield of studs and bumps. Its triangular head was guarded by slabs of bone that fitted together like a jigsaw.

As well as this thick, bumpy armour, *Edmontonia* had another way of defending itself. On each side of its body, it had a row of sharp, bony spikes. These stuck out sideways like a prickly fringe along its body. When attacked, *Edmontonia* probably crouched down on the ground to protect its soft, defenceless belly.

LEAF TEETH

As it browsed amongst low-growing plants, this dinosaur tore off shoots with its sharp, toothless beak. Further back inside its massive jaws, a row of leaf-shaped teeth helped it chew up its food.

SIZE WISE

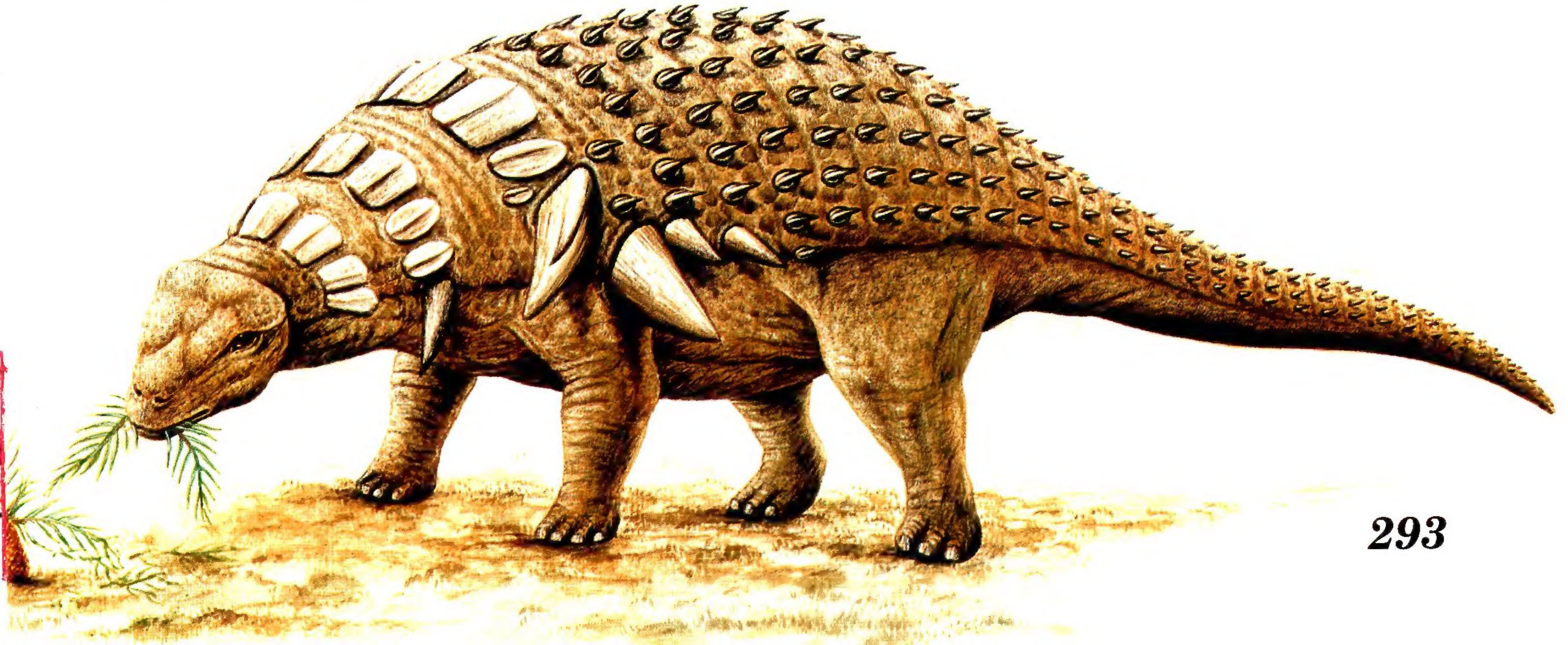


MONSTER FACTS

- **NAME:** *Edmontonia* (ed-mon-tone-ia) means 'of Edmonton'
- **SIZE:** 7m long and about 1.6m high
- **FOOD:** low-growing plants
- **LIVED:** 80 million years ago in the Late Cretaceous Period in Canada and the USA

WELL SUPPORTED

Edmontonia walked on four sturdy legs that were strong enough to support its broad, flat body. It had a short neck and a tail that was tapered at the end.



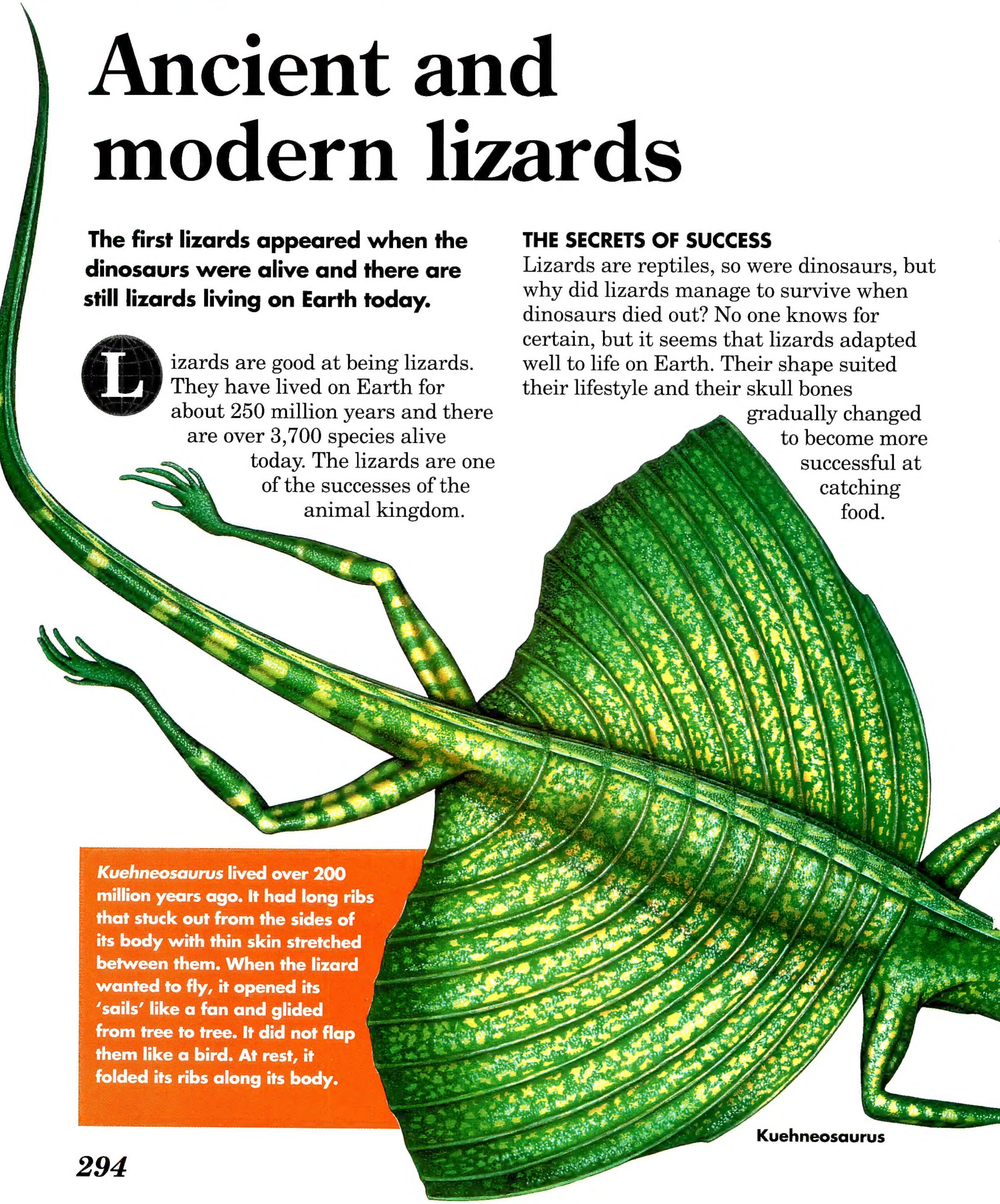
Ancient and modern lizards

The first lizards appeared when the dinosaurs were alive and there are still lizards living on Earth today.

Lizards are good at being lizards. They have lived on Earth for about 250 million years and there are over 3,700 species alive today. The lizards are one of the successes of the animal kingdom.

THE SECRETS OF SUCCESS

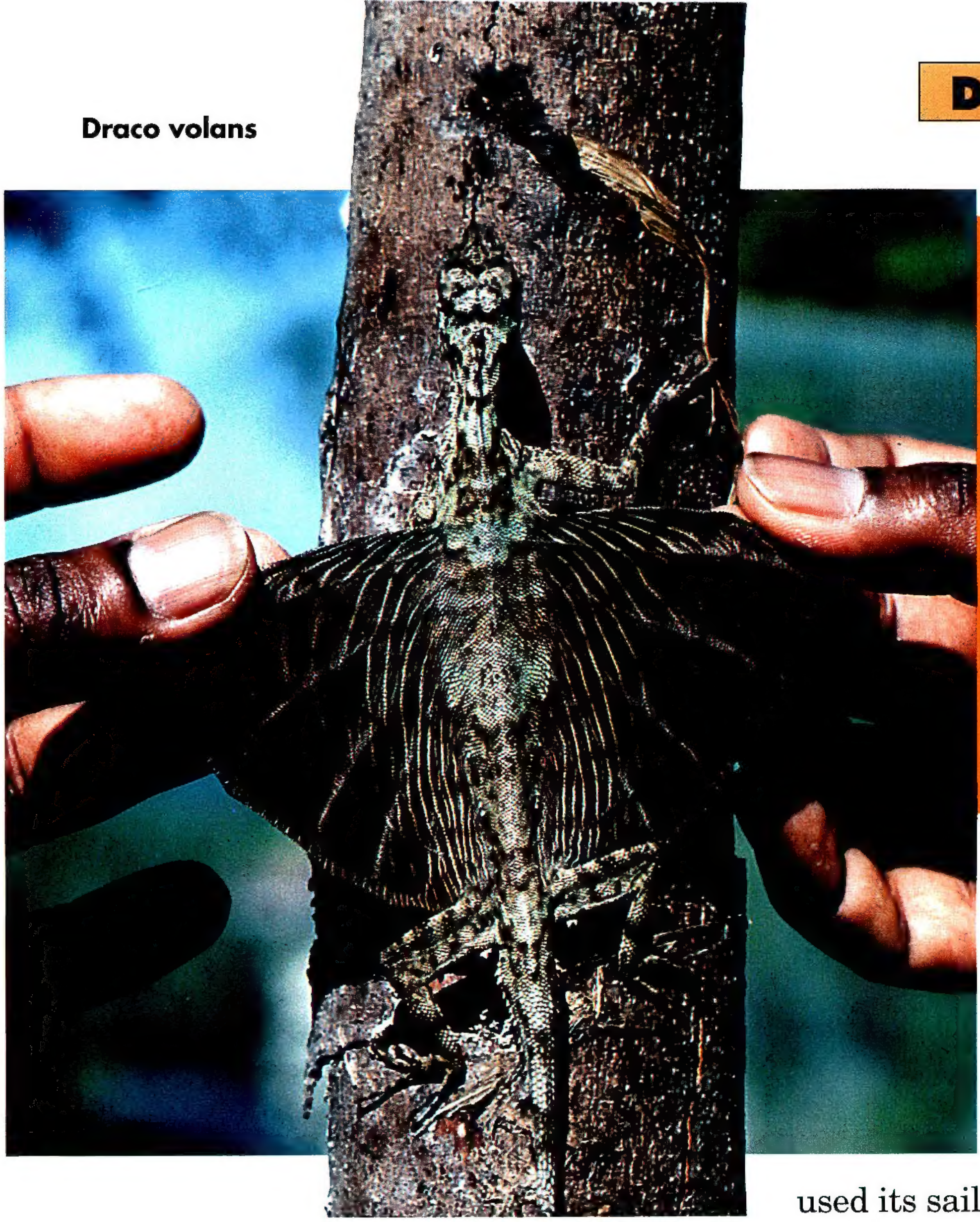
Lizards are reptiles, so were dinosaurs, but why did lizards manage to survive when dinosaurs died out? No one knows for certain, but it seems that lizards adapted well to life on Earth. Their shape suited their lifestyle and their skull bones gradually changed to become more successful at catching food.



Kuehneosaurus lived over 200 million years ago. It had long ribs that stuck out from the sides of its body with thin skin stretched between them. When the lizard wanted to fly, it opened its 'sails' like a fan and glided from tree to tree. It did not flap them like a bird. At rest, it folded its ribs along its body.

Kuehneosaurus

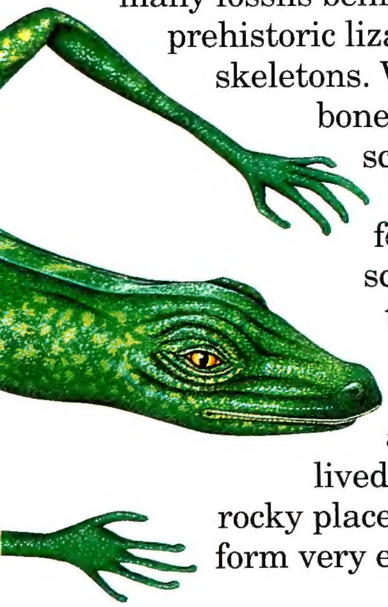
Draco volans



***Draco volans*, a modern lizard, looks very similar to *Kuehneosaurus*. It also has 'sails' of very fine skin, but they stretch between its fore- and hind-limbs. *Draco volans* uses them to glide from tree to tree in the forests of south-east Asia. Its name means 'flying dragon' and its record glide is 15m. That is about as far as 15 adult human paces.**

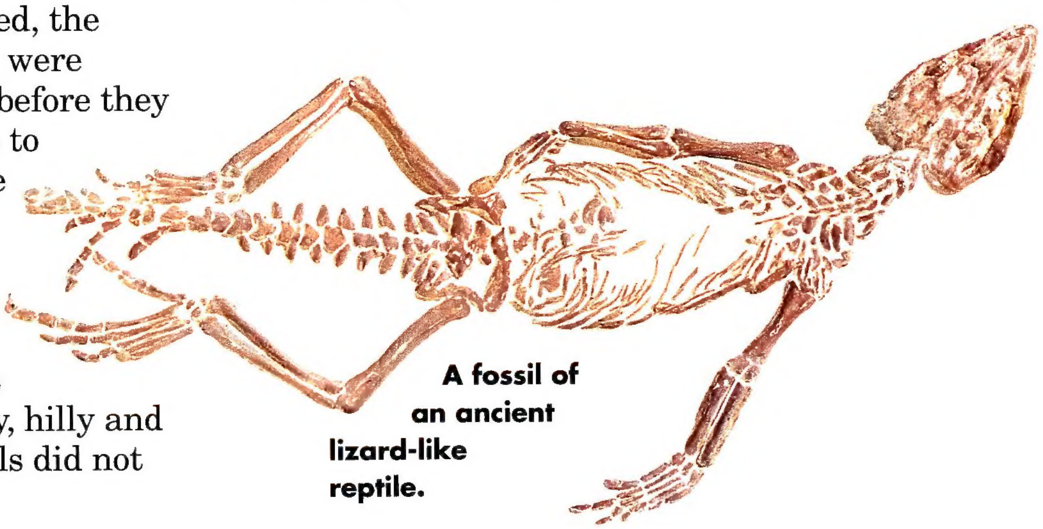
FRAGILE FOSSILS

Although lizards were alive at the same time as the dinosaurs, they have not left many fossils behind. Most of these prehistoric lizards had fragile skeletons. When they died, the bones broke up or were scattered long before they had a chance to fossilize. Some scientists also think that these lizards of ancient times lived mostly in dry, hilly and rocky places where fossils did not form very easily.



GLIDING LIZARDS

But some fossils survived. One of them is *Kuehneosaurus* (koo-nee-oh-saw-rus), a lizard that lived over 200 million years ago in the Early Jurassic. It used its sails of skin to glide from tree-top to tree-top searching for insects to eat. Today, there are many gliding lizards in warm countries that look very like *Kuehneosaurus*. One of them is *Draco volans*, a lizard that lives in the tropical forests of south-east Asia.



A fossil of an ancient lizard-like reptile.

LIVING LIZARDS

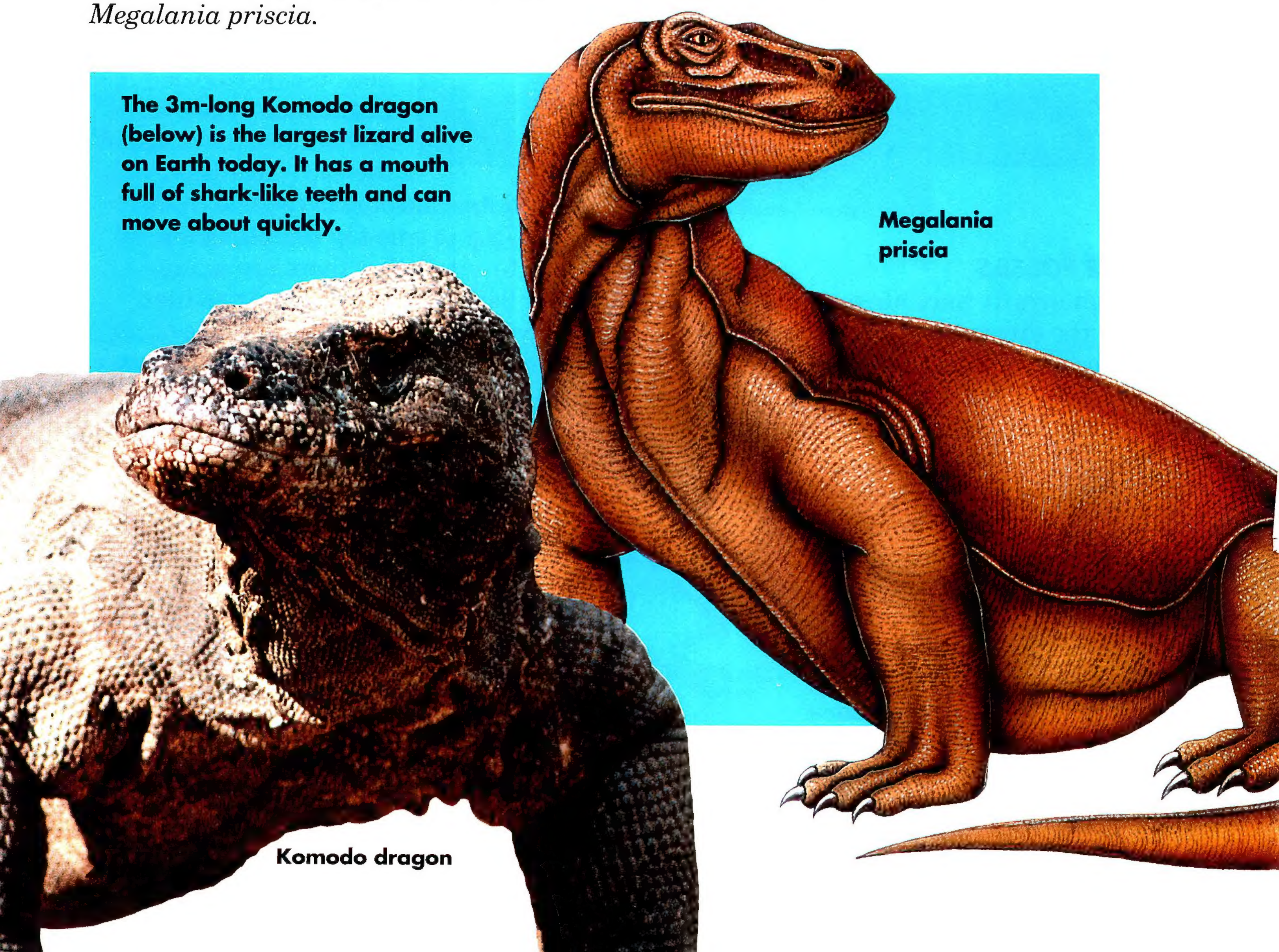
Geckos, iguanas and monitor lizards all shared the Earth with the dinosaurs. But they have succeeded where the dinosaurs failed. When the dinosaurs died out, these kinds of lizard were among the species that survived and they can be found in different parts of the world today.

MODERN MONSTERS

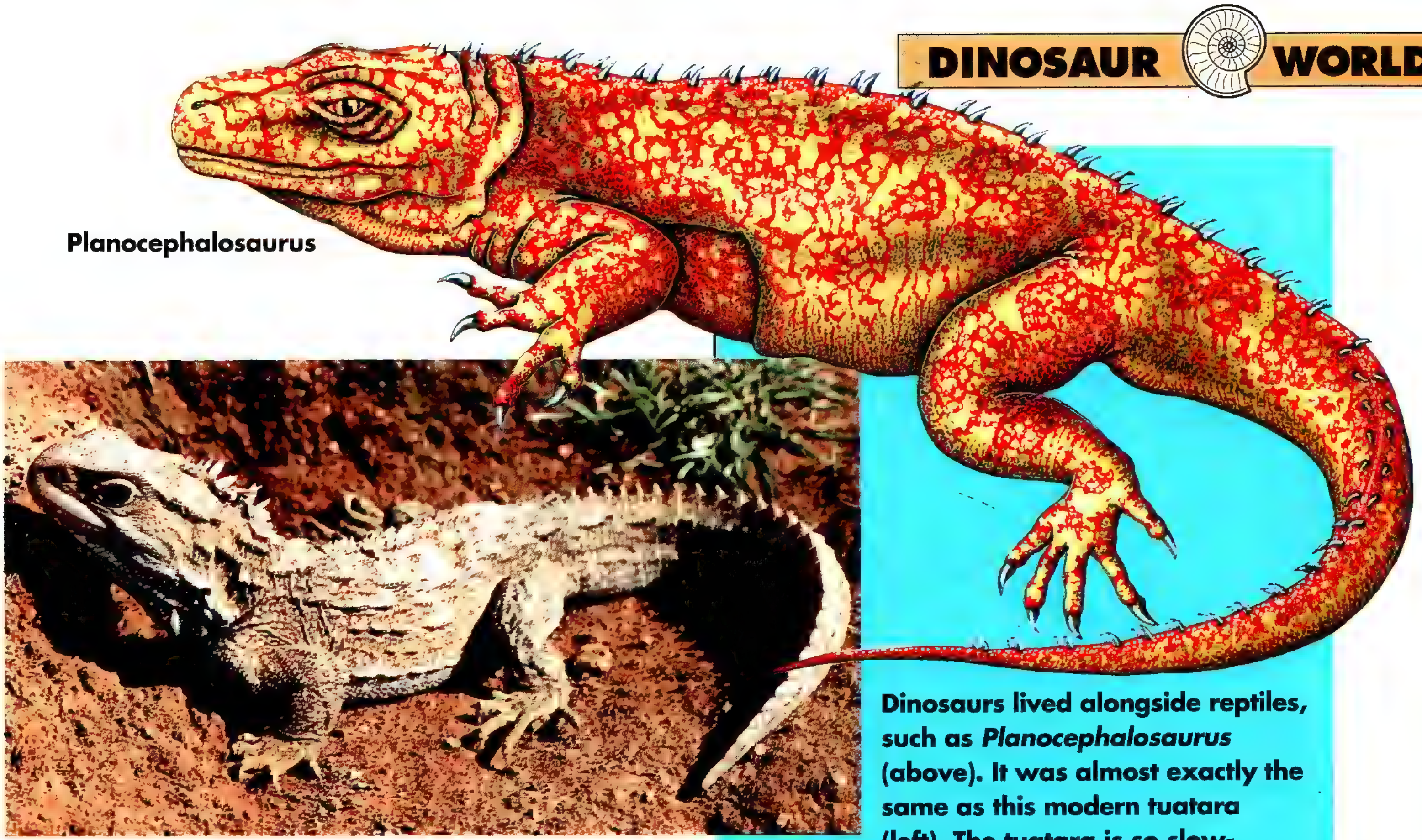
On a small island in Indonesia, a country in south-east Asia, lives Earth's largest lizard, the Komodo dragon. It is a type of monitor lizard that grows up to 3m in length and feeds on animals like monkeys, goats and deer. A giant lizard, very similar to the Komodo dragon, but much larger, stalked through what is now Australia about 2 million years ago. It was called *Megalania priscia*.

Geckos like this one (above) have been around since the Age of Dinosaurs. They cling to smooth surfaces using hooks on the soles of their feet.

Ancient *Megalania priscia* (below) was a terrifying 8m-long lizard – much bigger than the largest lizards alive today. It lived 2 million years ago.



The 3m-long Komodo dragon (below) is the largest lizard alive on Earth today. It has a mouth full of shark-like teeth and can move about quickly.



Dinosaurs lived alongside reptiles, such as *Planocephalosaurus* (above). It was almost exactly the same as this modern tuatara (left). The tuatara is so slow-growing that it does not become fully grown until it is about 50 years old and it lives until about 100. It lives life so slowly that it can fall asleep in the middle of a mouthful of food.

LIZARD RELATIVES

The first true lizards appeared on Earth about 250 million years ago – millions of years before the arrival of the dinosaurs. Lizards have some very interesting relatives that belonged to a different branch of the family tree and lived at the same time. They were the lizard-like reptiles and they also lived through the Age of the Dinosaurs.

What is? A LIVING FOSSIL

A living fossil is an animal species that has survived unchanged for millions of years. Its ancestors were alive millions of years ago and its descendants, which are almost identical, are alive today. The tuatara is a living fossil and so is a large fish called a coelacanth. Most other animal species change over long periods of time.

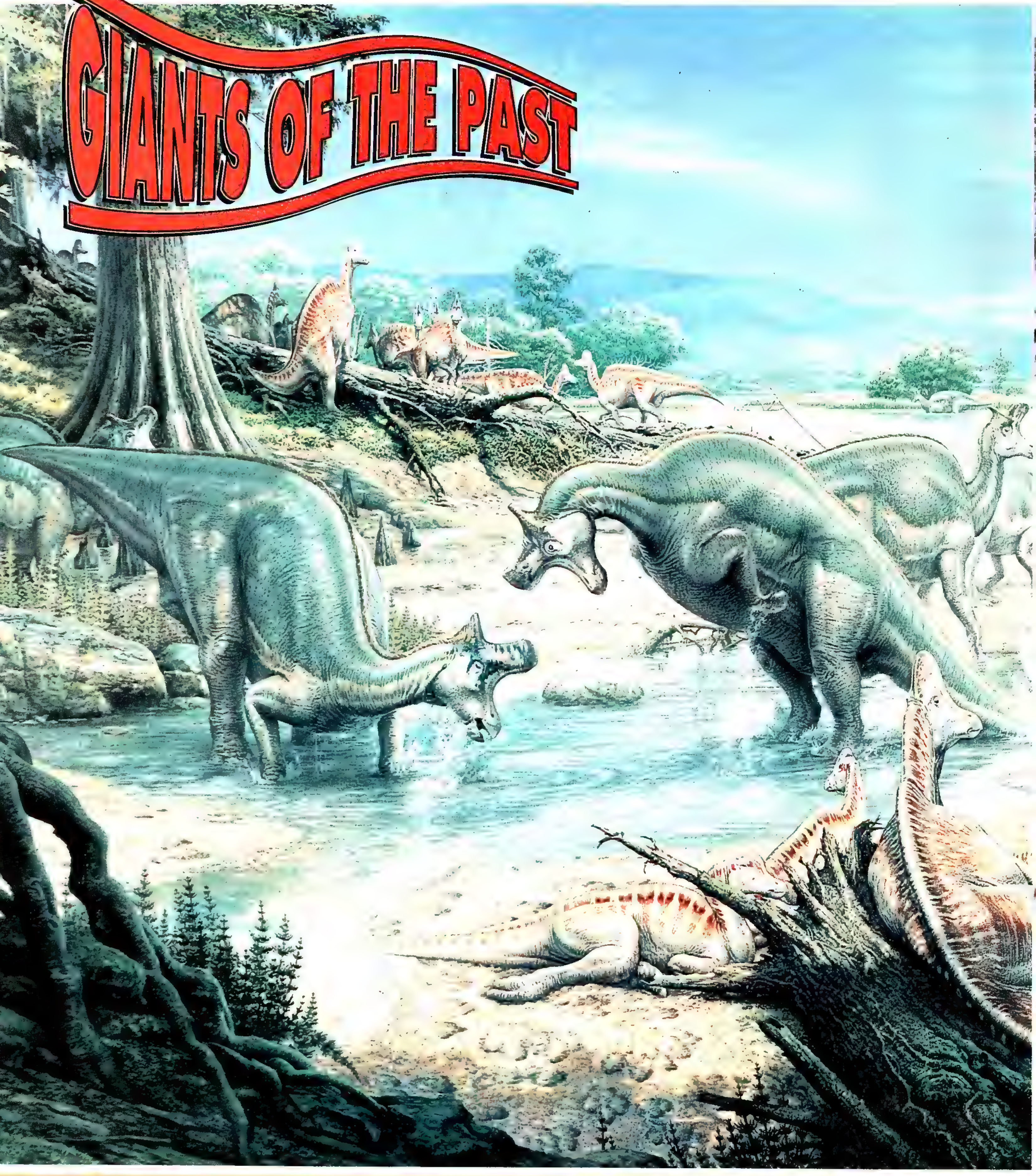
A LIVING FOSSIL

There is still a lizard-like reptile alive today. The tuatara is so rare that it lives only on a few islands off the north coast of New Zealand. Its ancestors, called *Planocephalosaurus* (plan-oh-sef-al-oh-saw-rus), were alive at the time of the dinosaurs. The tuatara has not changed for 200 million years – it is a special type of animal known as a living fossil.

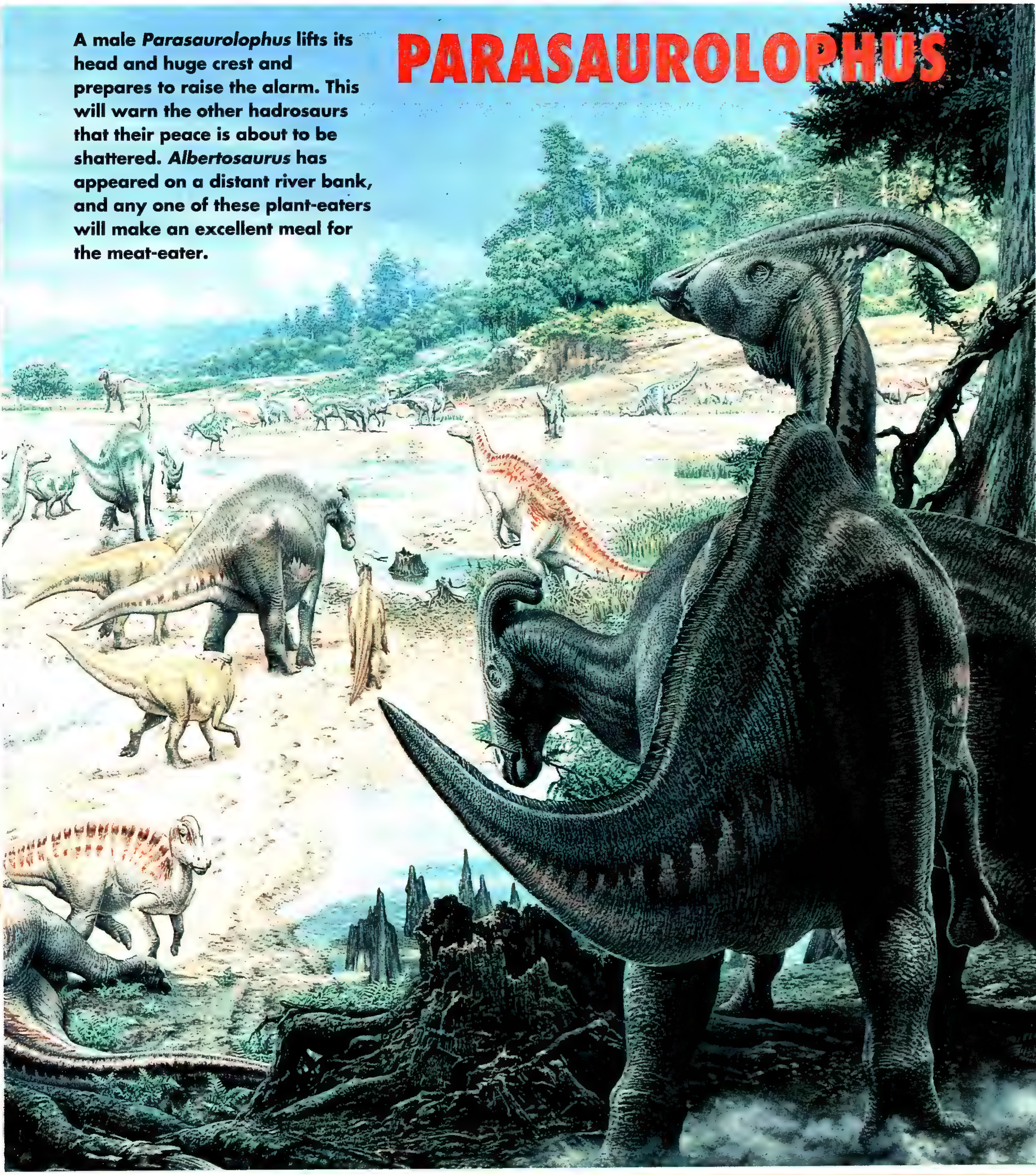
LYING LOW

While dinosaurs ruled, lizards kept a low profile and learned to adapt. Some lizards ruled the seas. These were the mosasaurs, the gigantic lizards that lived in the oceans of the world. But like the dinosaurs, the mosasaurs died out and the lizards that lived on land were left to survive to the present day.

GIANTS OF THE PAST



PARASAUROLOPHUS



A male *Parasaurolophus* lifts its head and huge crest and prepares to raise the alarm. This will warn the other hadrosaurs that their peace is about to be shattered. *Albertosaurus* has appeared on a distant river bank, and any one of these plant-eaters will make an excellent meal for the meat-eater.

3-D Gallery

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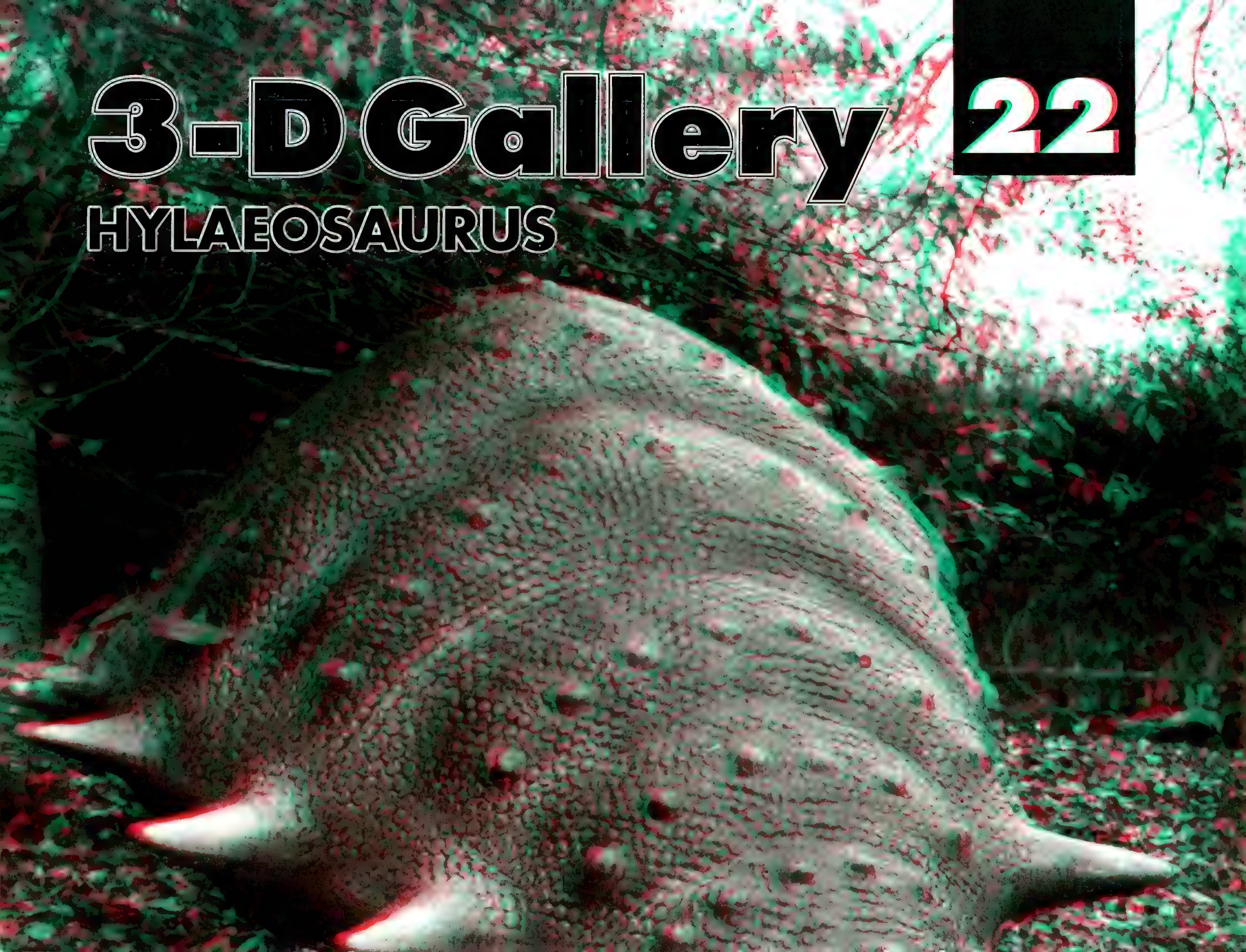
HYLAEOSAURUS



- Armoured dinosaur with spiked tail
- Lived about 130 million years ago in southern England
- Measured 4m long
- Ate plants

Horns

Whether they were long and threatening or just for show, dinosaurs' horns came in many shapes and sizes.

Armed with an unfriendly display of horns, the ceratopians (horned dinosaurs) looked like prehistoric warriors, but they were not the only dinosaurs with horns, nor were they always looking for a fight.

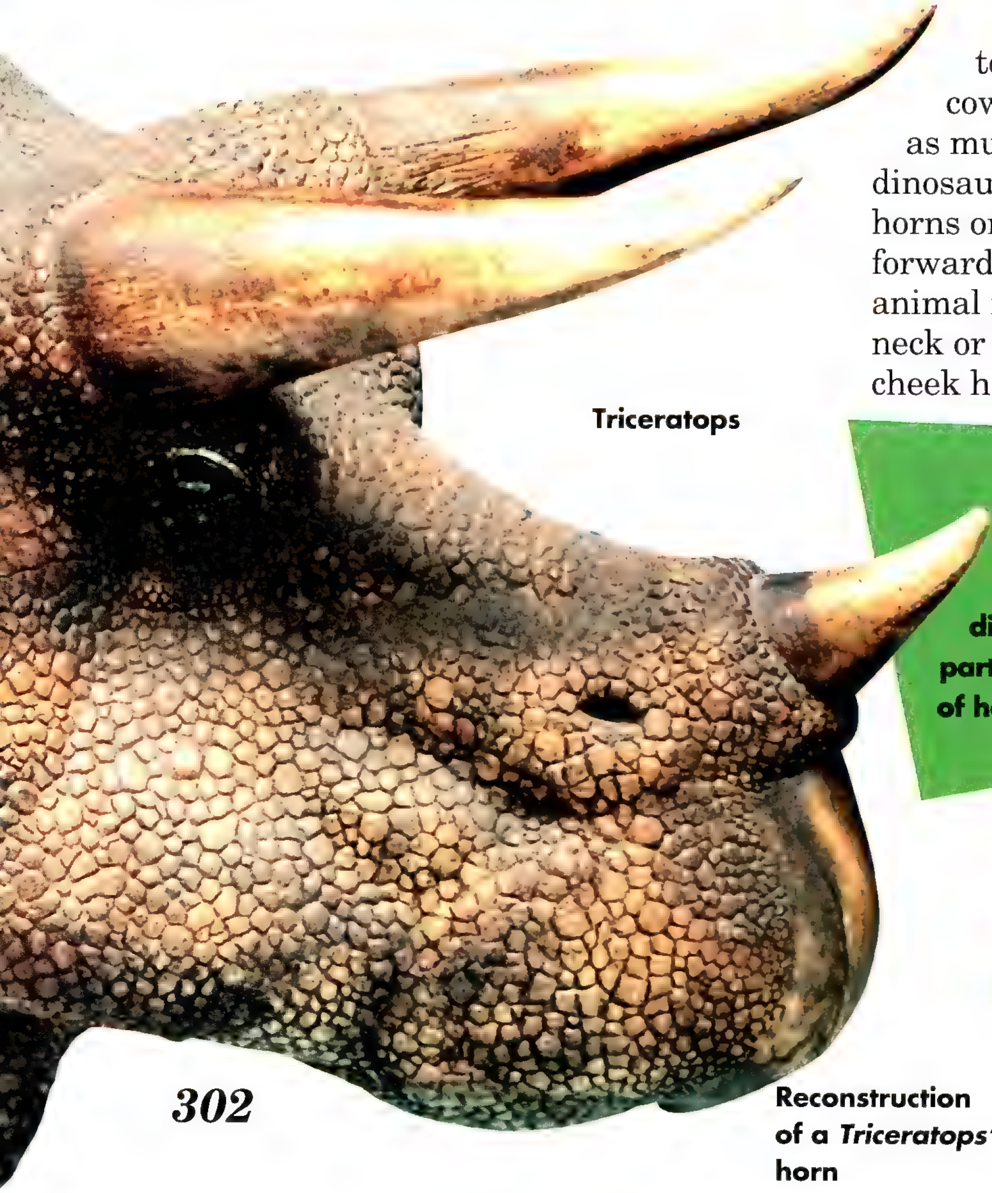
RHINO DINOS

At a glance, some ceratopians looked like rhinoceroses. They had large horns on their noses and smaller ones on their brows. This group includes *Centrosaurus*, *Monoclonius* and *Styracosaurus*. The upward-pointing nose horns were perfectly placed for spearing the soft underbelly of a tall meat-eater, such as *Tyrannosaurus rex*.

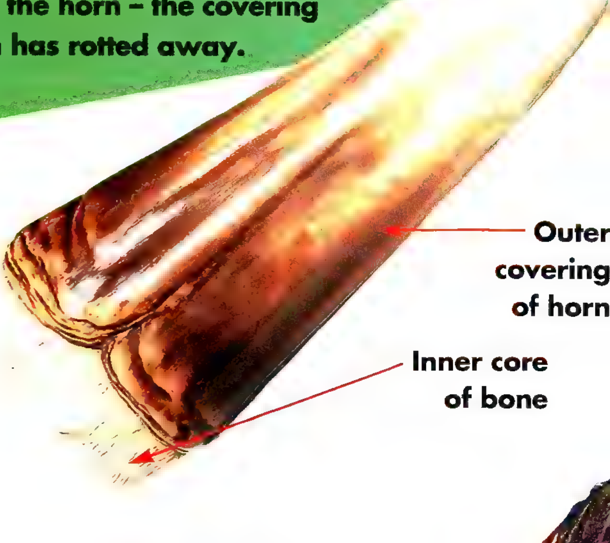
BROW HORNS

Its massive horns and huge bulk made *Triceratops* one of the most powerful plant-eaters. If you were to put one hippopotamus and two cows on the scales, they would weigh as much as one *Triceratops*. The dinosaur belonged to a group that all had horns on their brows. The horns pointed forwards and upwards, protecting the animal from attacks, particularly to its neck or face. *Triceratops* also had nose and cheek horns, but these were much smaller.

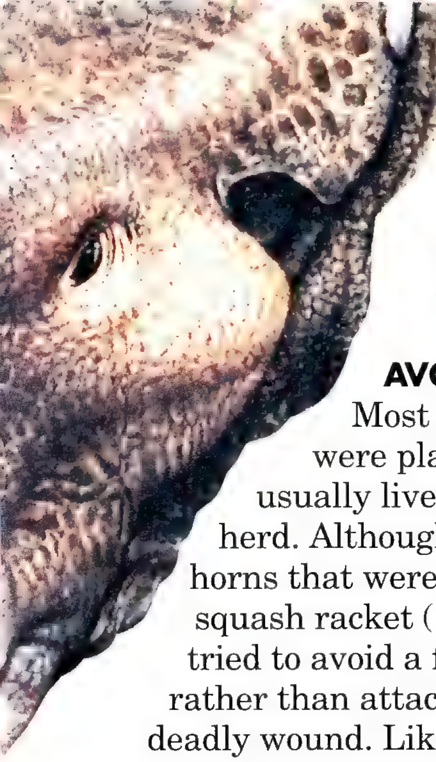
Dinosaur horns were made of bone and covered in a layer of horn to protect them. When you look at the fossil skull of a horned dinosaur, you see only the bony part of the horn – the covering of horn has rotted away.



Triceratops



Reconstruction of a *Triceratops'* horn



***Centrosaurus* had a big nose horn that it used to threaten any predators.**

AVOIDING A FIGHT

Most horned dinosaurs were plant-eaters and usually lived a peaceful life in a herd. Although *Triceratops* had horns that were twice as long as a squash racket (1.2m), it probably tried to avoid a fight with an enemy rather than attacking and risking a deadly wound. Like a bull preparing to charge, *Triceratops* would have tucked its head down and waved its horns from side to side, hoping to scare away a predator. *Centrosaurus* may have simply stood sideways on to its opponent, showing off its massive nose horn in the hope that this would frighten off its attacker. Large horns may also have attracted a female.

Just like horned dinosaurs, many modern animals use their horns as a weapon. This male Jackson's chameleon (above), from eastern Africa, uses its long nose horn to fight other males or to defend itself when it is attacked by a predator.

FORCED TO FIGHT

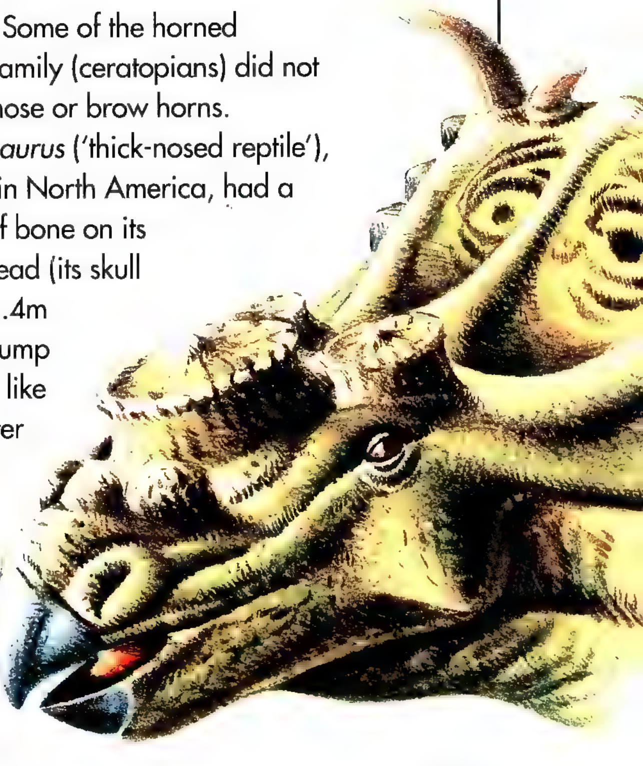
Ceratopians probably only got into a fight if they were forced to defend themselves or their herd. Rivals within one herd fought for leadership or for a mate, clashing heads and horns, just like rams do today.

HORNED MEAT-EATER

Ceratopians were not the only dinosaurs with horns. *Carnotaurus*, a meat-eater, had hornlets over its eyes. The male *Carnotaurus* probably had longer horns than the females. Horns of different lengths helped male and female dinosaurs to recognise each other.

Is it true that some ceratopians did not have horns?

Some of the horned dinosaur family (ceratopians) did not have large nose or brow horns. *Pachyrhinosaurus* ('thick-nosed reptile'), which lived in North America, had a thick lump of bone on its enormous head (its skull alone was 1.4m long). The bump was shaped like a moon crater and was probably used to butt rivals.



Introducing the thick-heads

With big heads and strong bodies, the pachycephalosaurs ('thick-headed lizards') were built for battering.

PACHYCEPHALOSAUR CHECK LIST

- ● Ate plants
- ● Extra-thick skull
- ● Walked on two legs

For almost 50 years, a tooth was the only evidence that pachycephalosaurs (pack-ee-sef-a-loh-saws) had once walked on Earth. Scientists have now found other parts of pachycephalosaurs. These include skulls or bits of skulls. The experts were amazed at how thick the bone was on the top of the skulls, and gave the dinosaurs their name, which means 'thick-headed lizards'. From the fragments, scientists have discovered much more about these animals.

LITTLE AND LARGE

The giant of the thick-heads was *Pachycephalosaurus* (pack-ee-sef-a-loh-saw-rus). Experts believe it could have grown up to 8m long – about the same length as a 24-seater bus. It was a bit taller than an elephant. Other members of the group were much smaller. *Homalocephale* (hom-al-oh-sef-a-lee) was probably less than 3m long and not much taller than a man. *Stegoceras* (steg-oh-ser-as) was just 2.5m long and about the same height as a horse.

BONE-HEADS

All the thick-heads had big, odd-looking heads. Scientists think that this was because the dinosaurs used their heads like battering rams to attack others or defend themselves.

The thick-heads came in many different shapes and sizes. *Pachycephalosaurus*, the giant of the family, was almost three times as tall as *Homalocephale*.

IT'S A FACT

BONE HEAD

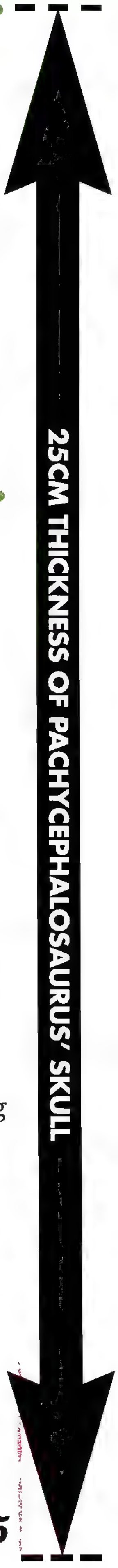
The enormous dome-shaped top of *Pachycephalosaurus'* head was not filled with brains. The extra height was made up of solid bone. On the top of the skull, the bone was up to 25cm thick. That is almost as thick as this page is long.

BUILT TO BATTER

The thick-heads were built to batter. Unlike other dinosaurs, their heads were held at an angle to the backbone. The backbone itself was especially strong. When these animals clashed their heads together, the shock of each blow was cleverly absorbed by their bodies, like shock absorbers in a car.

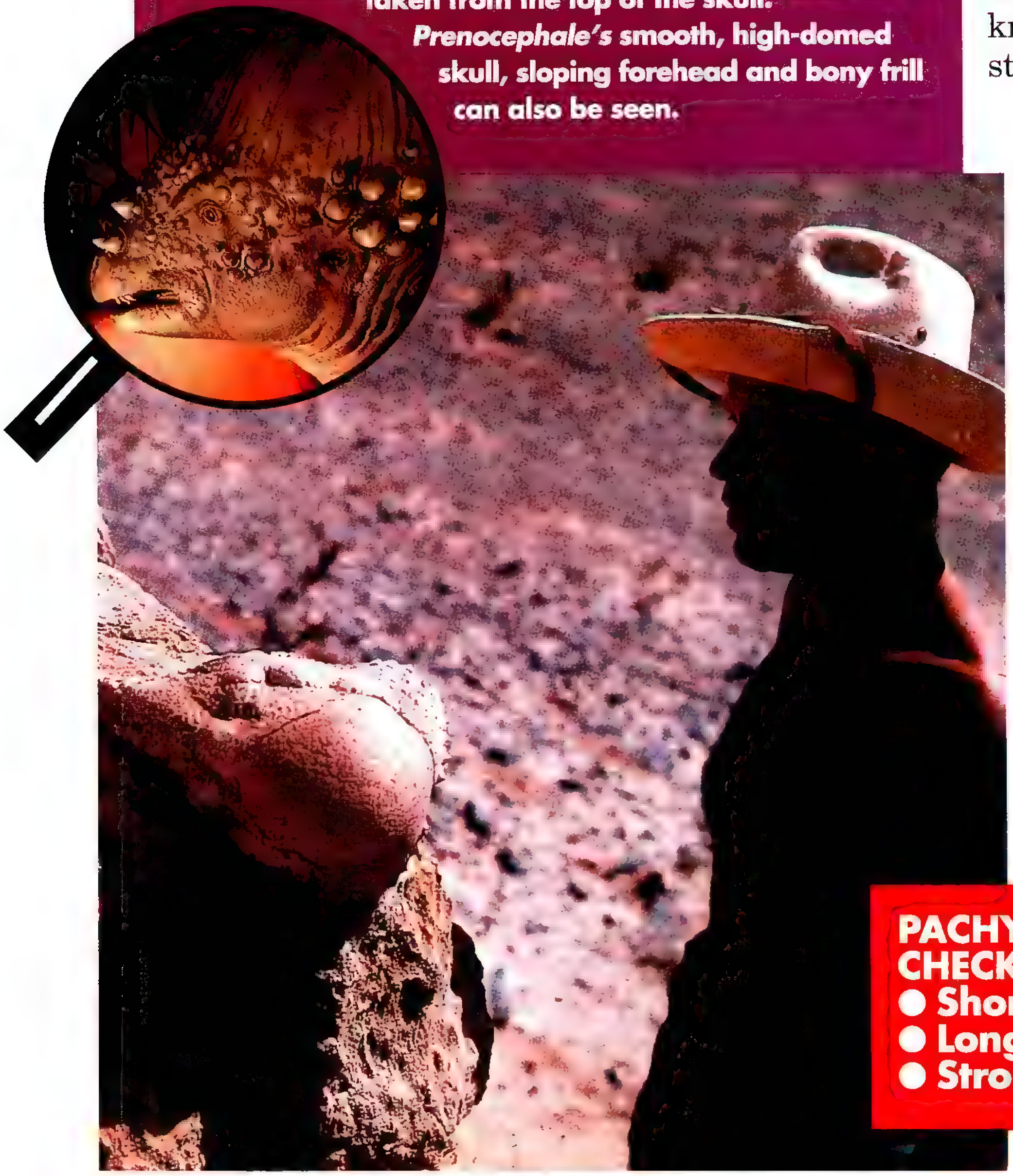
LIFESTYLE

The thick-heads were slow-moving herbivores. Their only protection against meat-eating dinosaurs was their tough skulls. Pachycephalosaurs probably moved around in herds, like modern sheep and goats. Very few fossils have been found. This might be because they lived in rocky hills where it was hard for their skeletons to become fossils.



HIGH AND LOW

Pachycephalosaurus had a high, dome-shaped skull, but *Homalocephale's* head had a much lower dome. Other thick-heads are also divided into high- or low-domed types. Because of this, some experts think there may have been two separate groups of thick-heads. But other experts think that all pachycephalosaurs belonged to the same group.



A *Prenocephale* skull sticks out of a rock in the Gobi Desert, Mongolia, where it was discovered in 1970. The skull is facing away from the man and the photograph is taken from the top of the skull.

***Prenocephale's* smooth, high-domed skull, sloping forehead and bony frill can also be seen.**

NORTH AND SOUTH

Most pachycephalosaurs roamed North America and Asia. But one has been discovered much further south. *Majungatholus* was discovered on Madagascar, an island off Africa.

OUT OF THE ROCK

Prenocephale was one of the high-domed thick-heads. The bulging shape of its skull was seen sticking out of a rock in the Gobi Desert, in Mongolia, in 1970. The palaeontologists who found it could also see the row of bony knobs around its skull and its steep, narrow face.

LATE ARRIVALS

The thick-heads lived at the end of the Age of the Dinosaurs. *Stegoceras* was one of the earliest members of the group. It roamed North America about 80 million years ago. *Homalocephale* lived in southern and central Asia 70 million years ago. *Pachycephalosaurus* was not only the biggest thick-head, it was also the last. It was the only member of its group living when dinosaurs became extinct 66 million years ago.

PACHYCEPHALOSAUR CHECK LIST

- **Short arms**
- **Long, stiff tail**
- **Strong legs**

HEAD-TO-HEAD

The thick-heads all used their heads as weapons, but they probably used them in different ways. Scientists believe the high-domed types head-butted each other in tests of strength, just as mountain sheep and goats do today. The skulls of the low-domed types were weaker. They probably pushed their attackers aside with their heads like the modern marine iguanas (lizards that live on land and in the sea) of the Galapagos Islands, off the coast of South America.

WINNER TAKES ALL

Most of the head-to-head fights were probably with other thick-heads. When two males of the same size met during the mating season, they battled against each other to see which was the strongest. The winner then became leader of the herd and owner of all the females.

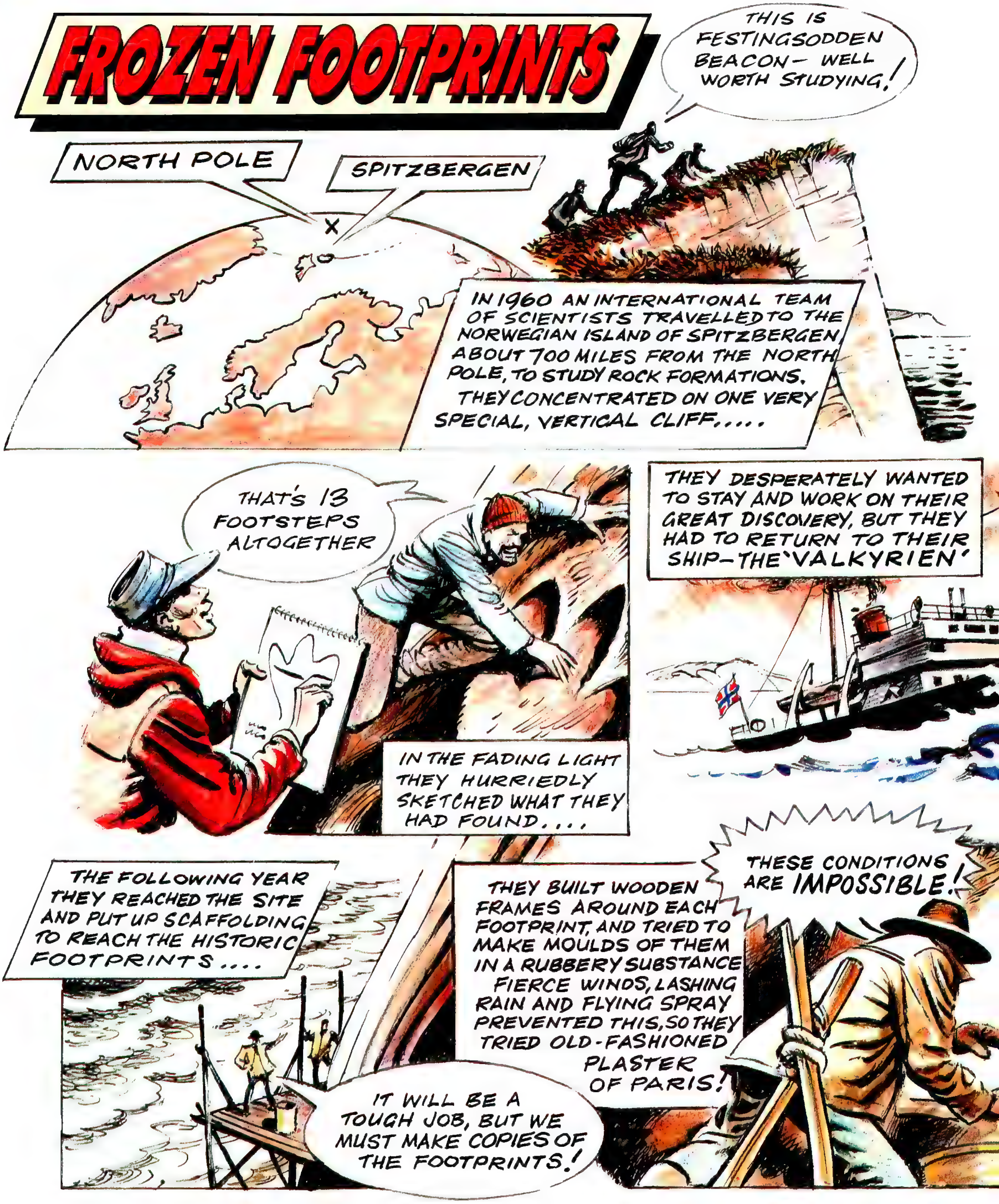
Is it true that a very early thick-head has been found?

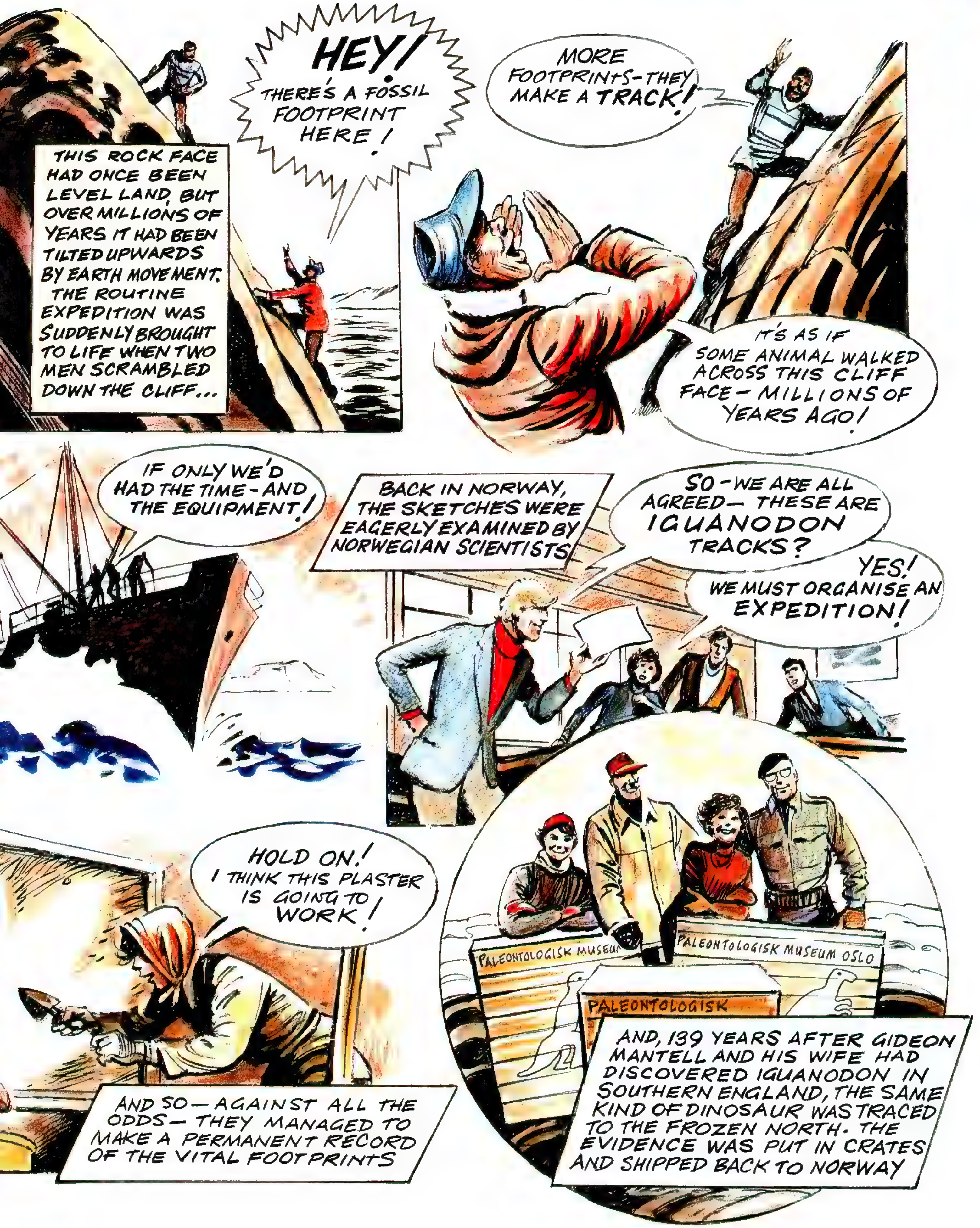
A tiny piece of skull from a dinosaur called *Yaverlandia* was found on the Isle of Wight, in Britain. It lived in the Early Cretaceous Period and had a slightly thicker skull than most other dinosaurs. This small fragment is the only evidence that scientists have, so they cannot prove that *Yaverlandia* was definitely a pachycephalosaur.

Two marine iguanas challenge each other to a shoving match (above). These animals push each other using the fronts of their heads, just like low-domed thick-heads (inset).

Bighorn sheep are more violent (left). During the mating season, they crash skulls. High-domed thick-heads probably clashed heads, too (inset).

FROZEN FOOTPRINTS


THIS IS FESTINGSODDEN BEACON – WELL WORTH STUDYING!
NORTH POLE
SPITZBERGEN
IN 1960 AN INTERNATIONAL TEAM OF SCIENTISTS TRAVELLED TO THE NORWEGIAN ISLAND OF SPITZBERGEN, ABOUT 700 MILES FROM THE NORTH POLE, TO STUDY ROCK FORMATIONS. THEY CONCENTRATED ON ONE VERY SPECIAL, VERTICAL CLIFF....
THAT'S 13 FOOTSTEPS ALTOGETHER
IN THE FADING LIGHT THEY HURRIEDLY SKETCHED WHAT THEY HAD FOUND....
THEY DESPERATELY WANTED TO STAY AND WORK ON THEIR GREAT DISCOVERY, BUT THEY HAD TO RETURN TO THEIR SHIP – THE 'VALKYRIEN'
THE FOLLOWING YEAR THEY REACHED THE SITE AND PUT UP SCAFFOLDING TO REACH THE HISTORIC FOOTPRINTS....
THEY BUILT WOODEN FRAMES AROUND EACH FOOTPRINT, AND TRIED TO MAKE MOULDS OF THEM IN A RUBBERY SUBSTANCE. FIERCE WINDS, LASHING RAIN AND FLYING SPRAY PREVENTED THIS, SO THEY TRIED OLD-FASHIONED PLASTER OF PARIS!
THESE CONDITIONS ARE IMPOSSIBLE!
IT WILL BE A TOUGH JOB, BUT WE MUST MAKE COPIES OF THE FOOTPRINTS!


THIS ROCK FACE HAD ONCE BEEN LEVEL LAND, BUT OVER MILLIONS OF YEARS IT HAD BEEN TILTED UPWARDS BY EARTH MOVEMENT. THE ROUTINE EXPEDITION WAS SUDDENLY BROUGHT TO LIFE WHEN TWO MEN SCRAMBLED DOWN THE CLIFF...
HEY! THERE'S A FOSSIL FOOTPRINT HERE!
MORE FOOTPRINTS - THEY MAKE A TRACK!
IT'S AS IF SOME ANIMAL WALKED ACROSS THIS CLIFF FACE - MILLIONS OF YEARS AGO!
IF ONLY WE'D HAD THE TIME - AND THE EQUIPMENT!
BACK IN NORWAY, THE SKETCHES WERE EAGERLY EXAMINED BY NORWEGIAN SCIENTISTS
SO - WE ARE ALL AGREED - THESE ARE IGUANODON TRACKS?
YES! WE MUST ORGANISE AN EXPEDITION!
HOLD ON! I THINK THIS PLASTER IS GOING TO WORK!
AND SO - AGAINST ALL THE ODDS - THEY MANAGED TO MAKE A PERMANENT RECORD OF THE VITAL FOOTPRINTS
PALEONTOLOGISK MUSEU
PALEONTOLOGISK MUSEUM OSLO
PALEONTOLOGISK
AND, 139 YEARS AFTER GIDEON MANTELL AND HIS WIFE HAD DISCOVERED IGUANODON IN SOUTHERN ENGLAND, THE SAME KIND OF DINOSAUR WAS TRACED TO THE FROZEN NORTH. THE EVIDENCE WAS PUT IN CRATES AND SHIPPED BACK TO NORWAY

Improve and test your knowledge with...

DINO Fact File

Climb down *Diplodocus'* neck answering the questions as you go.

3 Where did *Hylaeosaurus* live?
a) southern England
b) southern France
c) South America

4 Which was the giant of the pachycephalosaurs?
a) *Pachyspondylus*
b) *Pachyrhinosaurus*
c) *Pachycephalosaurus*

5 What does the name *Dracopelta* mean?
a) dragon breath
b) dracula skin
c) armoured dragon

6 Where has *Compsognathus* been found?
a) southern France and Germany
b) South America
c) Tanzania, Africa

7 How many species of lizard are there alive today?
a) about 37
b) about 370
c) about 3,700

8 What is the only known stegosaur from India?
a) *Torosaurus*
b) *Dromiceiomimus*
c) *Dravidosaurus*

9 Where was *Yaverlandia* found?
a) Isle of Wight, Britain
b) Isle of Man, Britain
c) Isle of Mull, Britain

10 Which of the following was a horned meat-eater?
a) *Carnotaurus*
b) *Triceratops*
c) *Protoceratops*

Eat like a dinosaur

In the early spring in the northern USA and southern Canada, young, curled-up ferns called 'fiddleheads' are eaten as vegetables. These ferns have been around since the time of the dinosaurs – and the ancient giants probably ate them, too!

Big bite

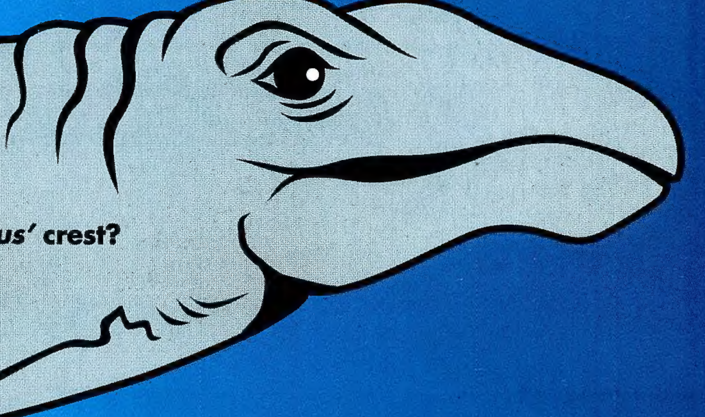
Kronosaurus was probably the largest marine pliosaur, measuring some 13m in length. Its huge head was almost a quarter of its body length and housed 80 deadly teeth. Kronosaurus had massive jaw muscles and strong teeth that would have given it a much more powerful bite than the greatest carnivorous dinosaur, Tyrannosaurus rex!

2 **How big was *Edmontonia*?**

- a) 20m long
- b) 7m long
- c) 3m long

1 **How long was *Parasaurolophus'* crest?**

- a) up to 8m
- b) up to 1.8cm
- c) up to 1.8m

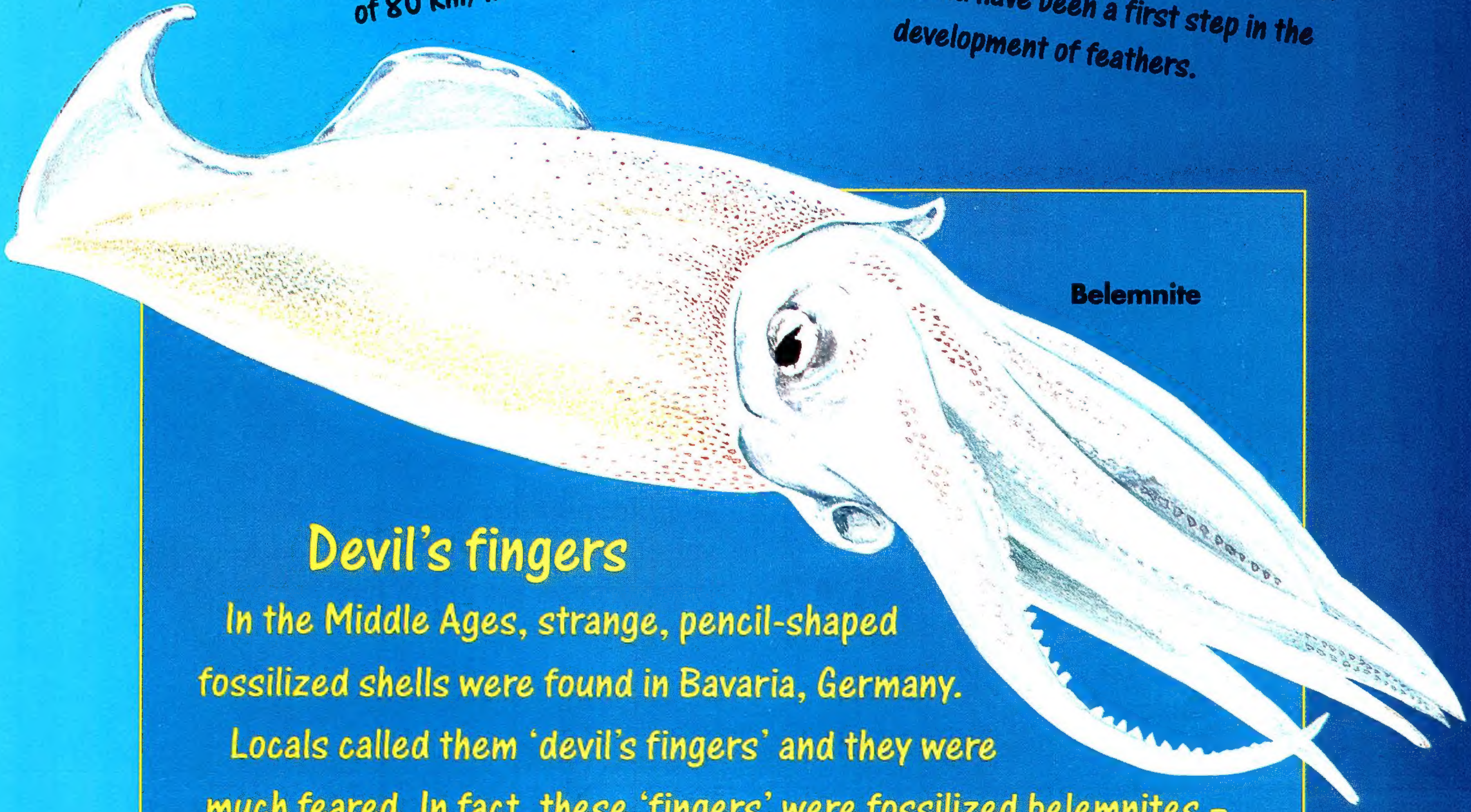


Running the Derby?

If the ostrich-like dinosaur Ornithomimus were to run in a horse race, it could very well win! Horses at full gallop reach speeds of just over 72 km/h, while Ornithomimus may have been able to run at speeds of 80 km/h.

Early parachuter

Longisquama, the tiny ancient reptile, had a row of tall, stiff scales along its back. No one knows exactly what they were for, but some scientists think they were used for gliding, rather like a parachute. Other scientists think that they could have been a first step in the development of feathers.



Belemnite

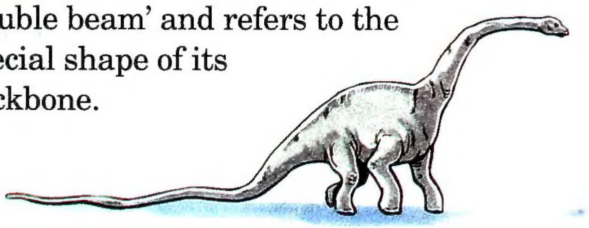
Devil's fingers

In the Middle Ages, strange, pencil-shaped fossilized shells were found in Bavaria, Germany. Locals called them 'devil's fingers' and they were much feared. In fact, these 'fingers' were fossilized belemnites – squid-like creatures that lived in shallow lagoons during the Jurassic Period.

Answers to the questions on inside back cover

DIPLODOCUS 150 MYA

An enormous plant-eating dinosaur, *Diplodocus* (di-plod-oh-kus) lived in North America. It had a long, thin neck, whip-like tail and sturdy body. It used its long neck to reach up to the tallest trees. Although this dinosaur was longer than a tennis court, it was quite slender. *Diplodocus* has become one of the most well known of all dinosaurs and copies of its skeleton can be seen in museums around the world. Its name means 'double beam' and refers to the special shape of its backbone.



DRACOPELTA 140 MYA

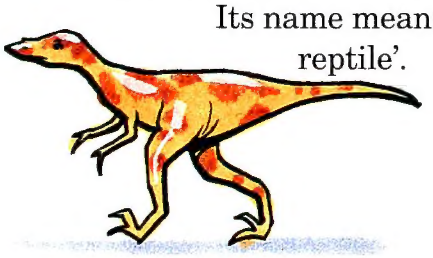
Dracopelta (drak-oh-pel-ta) had five different sorts of armour to protect it from predators. This small dinosaur lived during the Late Jurassic Period in Portugal. It was about 2m long and walked on four legs. Its name means 'armoured dragon'.

DRAVIDOSAURUS 75 MYA

Dravidosaurus (dra-vid-oh-saw-rus) was the only known stegosaur to live in what is now India. It was alive millions of years after the other stegosaurs had become extinct. *Dravidosaurus* was about as long as a small car. For protection, its body was armoured with bulging spines and plates. This dinosaur's name means 'reptile from southern India'.

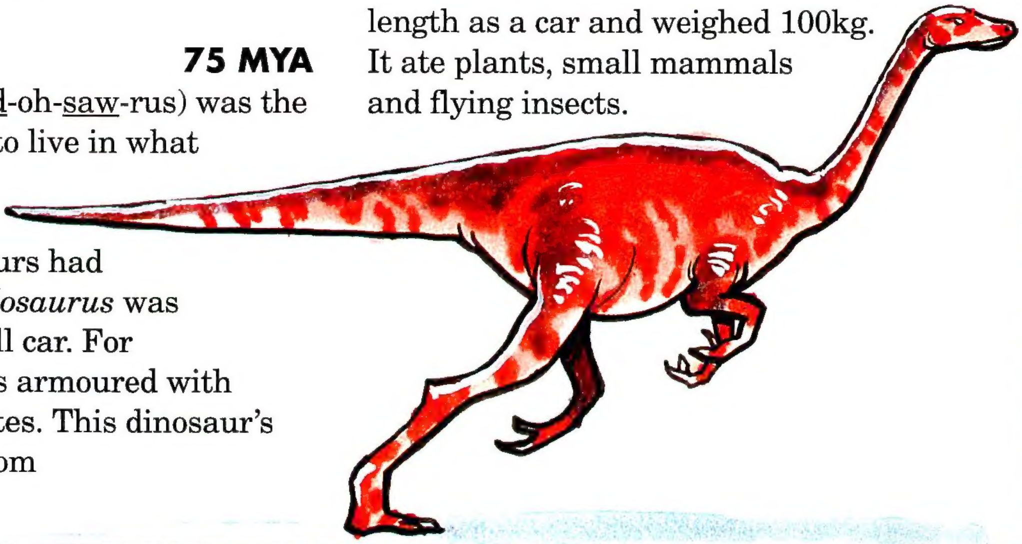
DROMAEOSAURUS 80 MYA

A small, agile dinosaur, *Dromaeosaurus* (drome-ee-oh-saw-rus) moved nimbly on two legs and had a special sharp claw on its foot, like *Deinonychus*. It lived in the Late Cretaceous Period and was about 1.8m long. *Dromaeosaurus*, which had powerful jaws and large fangs for tearing flesh apart, was first found in Alberta, Canada, in 1914. Its name means 'running reptile'.



DROMICEIOMIMUS 70 MYA

This ostrich-like dinosaur had long legs and big, sharp eyes. *Dromiceiomimus* (drome-ic-ee-oh-my-mus) lived in North America and had a small head but quite a large brain. Its best defence was that it could run very quickly and escape from predators. *Dromiceiomimus* was about the same length as a car and weighed 100kg. It ate plants, small mammals and flying insects.



COMING IN PART 14 OF

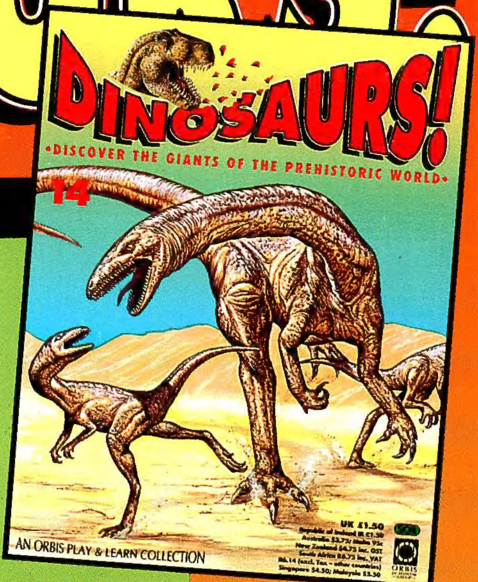
DINOSAURS!

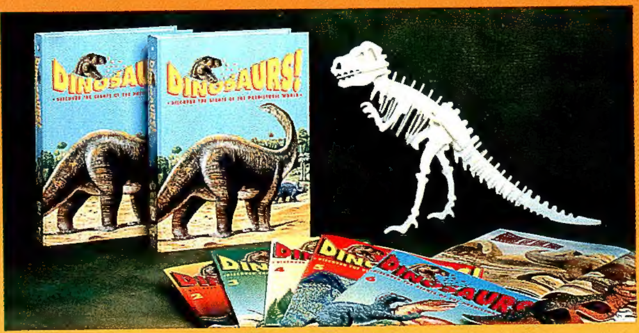
Find out why fleet-footed *Coelophysis* devoured its own young in IDENTIKIT, where you'll also come across bone-headed *Homalocephale* and giant *Saltasaurus*.

PLUS

DINOSAUR MODEL: The next pieces for your *T rex* body model.

And
TIME DETECTIVE
SPOTTER'S GUIDE
DINOSAUR WORLD


DINOSAURS!
•DISCOVER THE GIANTS OF THE PREHISTORIC WORLD•
14
AN ORBIS PLAY & LEARN COLLECTION
UK £1.50



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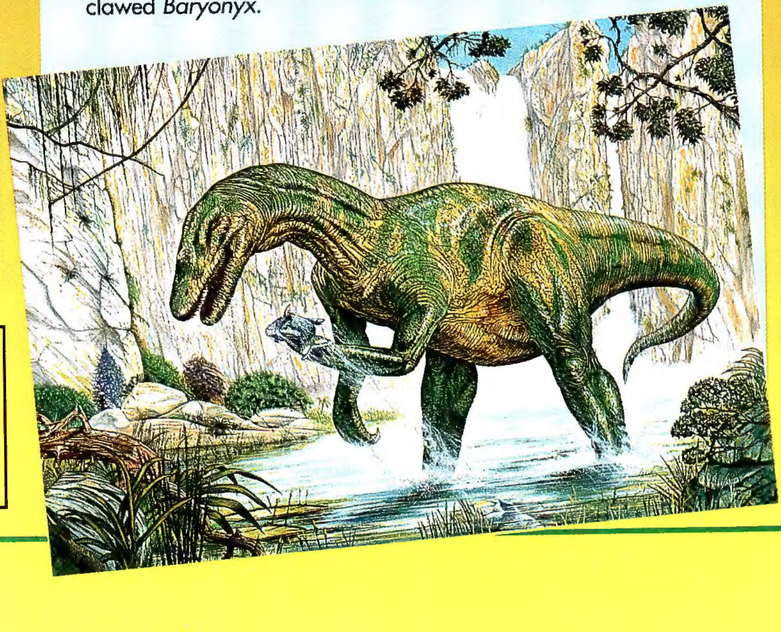
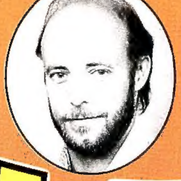
THE DINOSAURS! POSTER COLLECTION

Have you ever wanted to fill your room with dinosaurs? Now you have your chance – with the *Dinosaurs!* POSTER COLLECTION. Each poster is a 820 x 570mm (nearly eight times the size of this page) and features a superb dinosaur artwork. You'll find facts and figures about the dinosaur on the back – PLUS a look at some other prehistoric animals. The sixth poster is clawed *Baryonyx*.

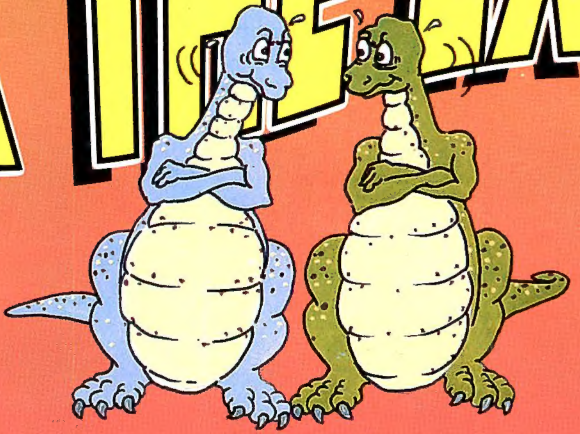


ANSWERS TO DINO FACT FILE QUESTIONS: 1. c, 2. b, 3. a, 4. c, 5. c, 6. a, 7. c, 8. c, 9. a, 10. a



Dr. David Norman of Cambridge University answers your dinosaur questions

ASK THE EXPERT

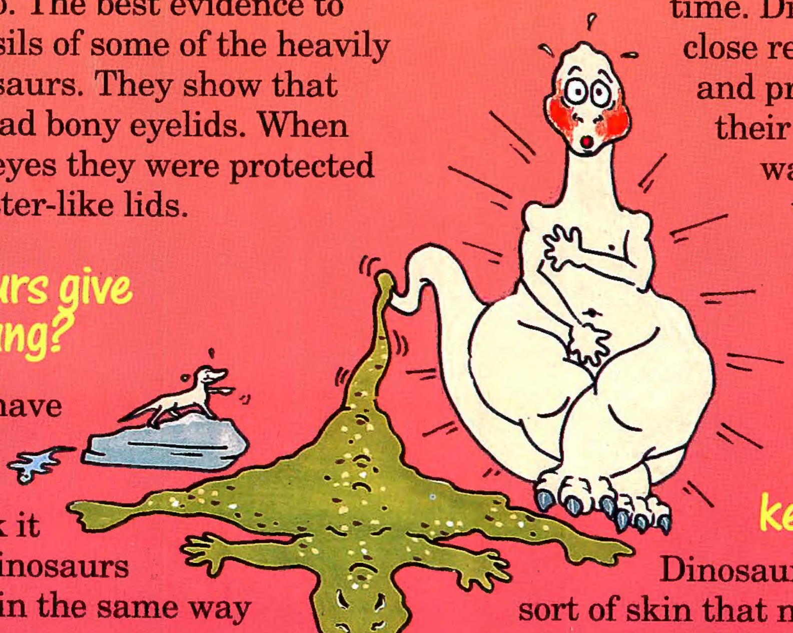


Did dinosaurs blink?

Dinosaurs had eyelids that would have allowed them to blink just as humans do. The best evidence to prove this are fossils of some of the heavily armoured ankylosaurs. They show that these dinosaurs had bony eyelids. When they closed their eyes they were protected behind hard, shutter-like lids.

Did any dinosaurs give birth to live young?

So far, we do not have any evidence that dinosaurs bore live young. I think it is likely that all dinosaurs laid shelled eggs, in the same way that birds lay eggs.



Did dinosaurs shed their skin like lizards do?

Lizards shed complete layers of skin from time to time. Dinosaurs are not close relatives of lizards and probably did not grow their skin in the same way. Outer layers of their skin would have been shed in bits and pieces like crocodile skin.

How did dinosaurs keep clean?

Dinosaurs did not have the sort of skin that needed to be kept especially clean. Neither did they have fur nor feathers, so they did not need to groom or preen themselves as mammals and birds do today. Dinosaur skin was tough and scaly. As with modern-day reptiles, any dirt would simply have stuck to the dinosaur's body until it rubbed off, or was shed along with skin scales. Dinosaurs would have shed their scales all the time as new ones grew to replace them.

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